GAS

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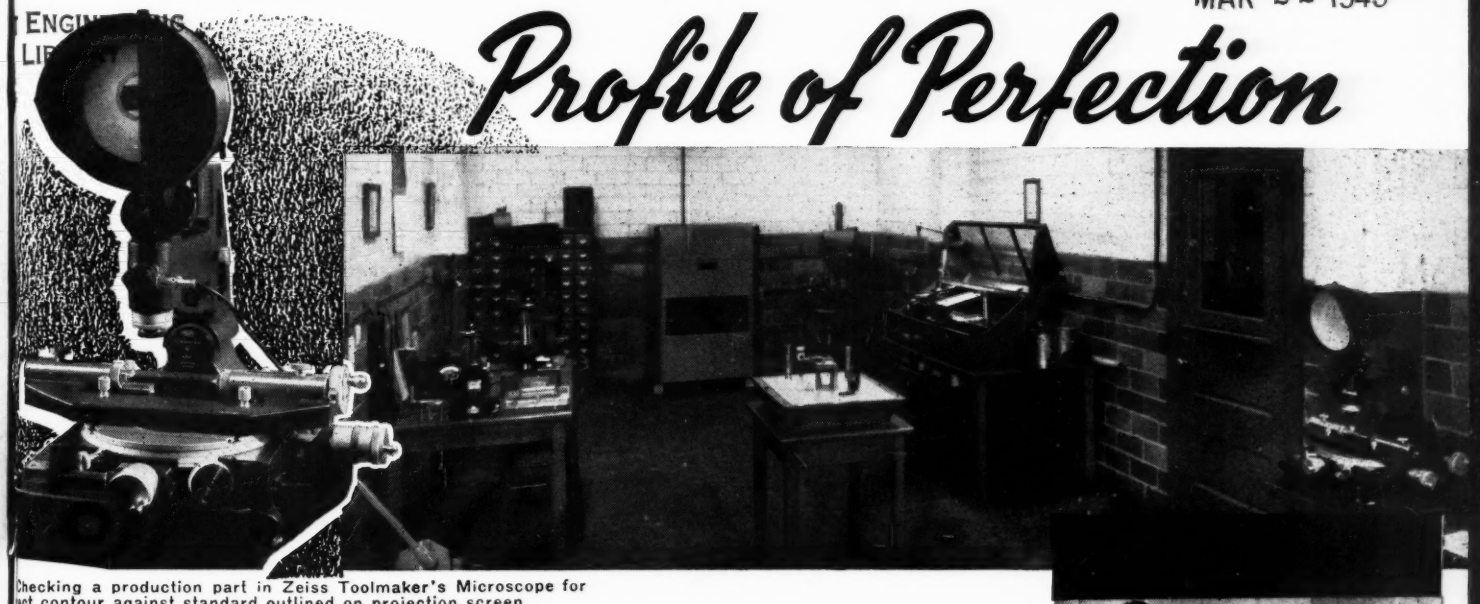

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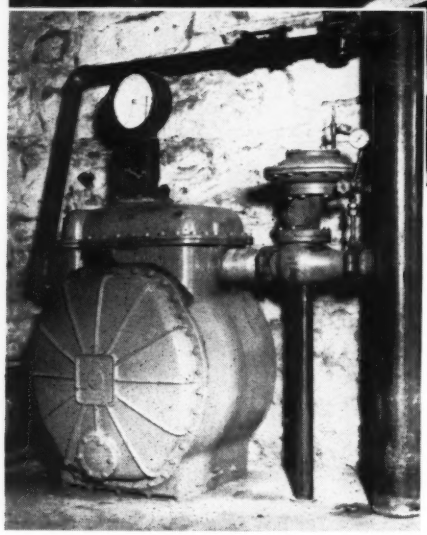

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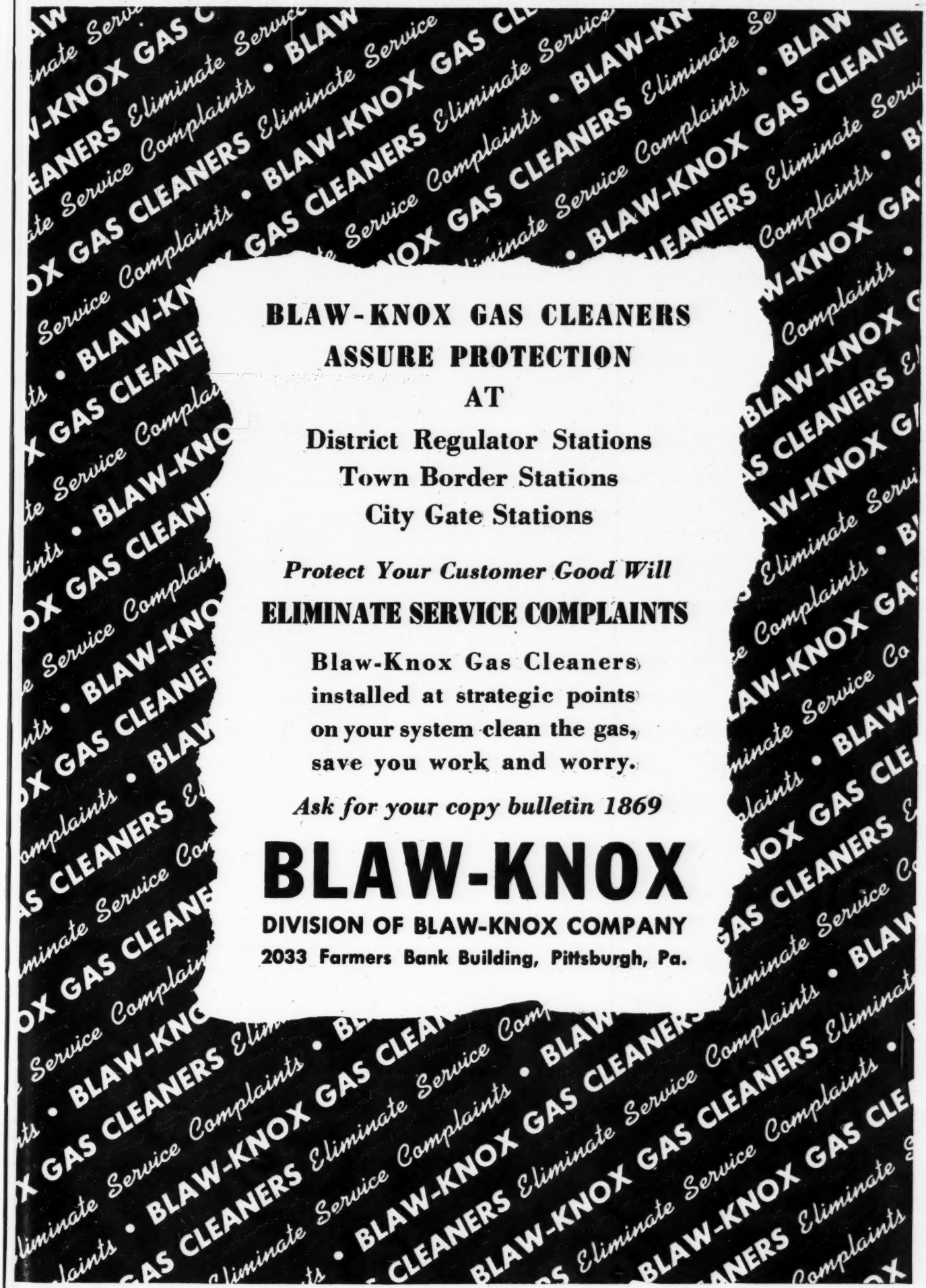
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GAS

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Twenty First Year of Publication

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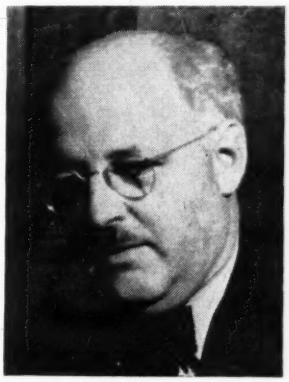
THERMALLY THINKING

By ELLIOTT TAYLOR, Washington Editor

COAL'S CATSPAW

WISCONSIN has a record and a reputation in progressive legislation that she won the hard way. She won it by disregarding the anguished bleats of reactionaries and vested interests always to be found who, having rigged up their own private pitch, demand that the caravan of progress detour around them. She earned it by electing and then supporting the hands of state senators and assemblymen who were believers in deeds rather than words as the implementing force behind social betterment. She did it by elevating an ideal in which the necessities, the conveniences and the comforts of the common man became a primary subject of legislative preoccupation.



E'liott Taylor

The greatest good for the greatest number is something more than a cliche from a civics text book in Wisconsin; it is a vital actuating force that finds outlet in an increasing array of social and economic remedies designed to translate it into new realities. True there are remedies that are tried and that prove to no avail, and these the intelligent practitioner is quick to abandon. But citizens of Wisconsin have none the less lived to see many a visionary experiment become a commonplace component of the pattern of social advancement.

That a Wisconsin state legislature, rich in its tradition of concern for the rank and file of the citizenry and wise to the blandishments of the predatory groups that seek special privilege at public expense, should have been made a catspaw for the coal and railroad interests is almost incredible. Yet it is a fact.

When in 1942 the Wisconsin public service commission went on record as favoring the introduction of natural gas into the state there was a near panic in lobbying circles at Madison. As a result, early in 1943 the legislature enacted the two most notorious natural gas obstruction laws of any state in the union. The first of these laws was designated to throw out the broad consideration of public convenience and necessity as a criterion in authorizing natural gas projects, substituting in its stead a reliance on the political caprice of every locality through which a proposed line might pass, or into which natural or mixed gas might be introduced. Thus the law says:

> "No such certificates of public interest and public convenience and necessity shall be issued which shall authorize the substitution of natural gas or a mixture of natural and manufactured gas in lieu of manufactured gas, or the provision of facilities or the expenditures of money therefore, in any city, village or town of which the board or municipal council shall not have first approved and authorized such substitution . . . "

In other words, the Public Service Commission of the state is powerless to grant certificates until every community along the proposed right of way had endorsed the project. The practical result of this, of course, as was intended, to set up barriers of delay and obfuscation that could hold up forever any action by the Commission favorable to natural gas lines.

This law was in itself about enough to shut the state out permanently from the benefits of natural gas, but just to button the job up tight and make the coal and railroad lobbies really happy, the solons then slapped a 7¢ per Mcf tax on natural gas consumption within the state.

The acting governor almost balked as he described the real purpose of the bill, saying:

> "It is obvious that the tax imposed by this bill is in the nature of a prohibitive sales tax, and that its effect would be to make it difficult if not impossible to introduce natural gas into this state . . . The Public Service Commission reached the conclusion that natural gas would be beneficial to the state, that it represents progress, and that to prevent its introduction into Wisconsin would be merely to subsidize the railroads, the coal business and the workers employed by these industries at the expense of the consuming public."

His conscientious objections notwithstanding, the acting governor signed the bill with a rather vague promise to recommend suitable legislation "at the proper time".

Repeal Measures Introduced

Whether in the opinion of the legislature now is the "proper time" we are not able to say. But there is a stirring among the proponents of an enlightened fuel policy for the state, and on February 9th, two bills were introduced to repeal the natural gas obstruction legislation. Within the past few weeks the repeal sentiment has been growing, and prominent newspapers have given it strong editorial support.

In the widespread public discussion that has been stimulated some carefully nursed myths of coal and railroad origin have been laid away in lavender. The fear that the solid fuel merchants will go out of business is belied by the experiences of Detroit where in the first four years after natural gas was introduced the number of coal retailers increased, as did the tonnage of coal sold.

Wisconsiners are also becoming aware that theirs is the only state in the union that has passed laws to exclude

natural gas, although a number have tried and are still toying with the idea of passing laws to keep their gas at home. It may be selfish and it has been judged unconstitutional, but it still makes some sense for a state to try to conserve its natural gas supply for its own citizens' benefit. But for a state to pass laws ruling out the very fuel that most states are clamoring for is running close to the border line of legislative lunacy.

Wisconsin has no coal mines; it has no oil wells; it has no natural fuel at all except cord wood and cow chips, and yet it aspires to a place of enhanced industrial importance in postwar manufacturing development. Let the railroads and the coal companies who so glibly advise the state to bar gas at its border, advise it how it will be able to attract and hold its share of the new postwar industries that will be interested in locating primarily in areas where clean fast flexible fuel is available. Texas, Louisiana, Oklahoma, Arkansas and Kansas all are out for the new industrialization that they believe will follow an abundant supply of natural gas.

Wisconsin's Last Chance?

If Wisconsin chooses to forbid gas entrance it will be alright with the producing states. It is now the opinion of many gas reserves experts that one or two more major pipe lines out of the big producing areas in Texas and Oklahoma will be the last until new discoveries open up presently unknown sources of supply. If this be the case, it may well be that the present opportunity will be the last chance as far as natural gas for Wisconsin is concerned.

We are convinced that the action of the 1943 legislature set back the economic clock in that progressive and enlightened state, but luckily it is an error that can, and we trust will be undone by the present body through repeal of the natural gas obstruction laws.

Five Point Buck

DR. E. P. Schoch, director of research on natural gas at the University of Texas has recently come out with a new plan for curing a high percent of the ills that the natural gas industry is suffering from in Texas and we'll be danged if we don't believe the professor has got something there.

The newspaper clippings we see call it the Austin-Plan with a capital P for plan and its a real five pointer and no fooling.

Point number one is to raise the average price of natural gas at the well from the current average of about 2¢ per Mcf to 10¢. We're for that if it can be done; but it doesn't say how right here where we are reading. But we'll go this far with Doctor Schoch, 2¢ gas at the well is uneconomic and damn near anti-social and it is responsible for about 90% of the wanton waste that new dealers and communists are always squawking about. We wrote an editorial on the subject a few months back.

Then point two is to establish three research centers in connection with University of Texas to develop new and more valuable uses for gas in its own industry and in connection with ceramics and cotton. The college crowd probably have something up their sleeve in that ceramics and cotton deal, but we are for it, too. Nine times out of ten when a professor wants to improve anything, he runs around claiming there ought to be a law passed, and then when the law is passed it develops that new laws have to be passed to make the first law work. And so on. Instead of setting a legal price for gas in the field, it will work a lot better and be a lot more binding on the pocketbook as well as the conscience of the gas fraternity if the price of their product goes up because it has actually become worth more. Research has already had a lot to do with finding new products that make gas more valuable.

Point three has a legal angle—it is to prorate gas as oil now is prorated under a ratable taking law. This presents some difficulties, but none that are any more insurmountable than the difficulties encountered in oil proration. Having made that crack, we will probably be getting letters for a month on the subject—none of which do we propose to answer.

Item four says the plan will discourage exportation of natural gas beyond Texas boundaries by making gas so valuable its owners would not sell it as an industrial fuel to compete against coal in the industrial east. That is a big order and in our opinion it is like Roosevelt's four freedoms—it represents more the vague outline of a hope than the proposing of a plan. But there is nothing for even the biggest of the natural gas carriers to get wrought up about even there. If gas increases in value for use in Texas it will increase in value for use elsewhere, or it will stay in Texas. That was true before Dr. Schoch broke into print and there is no harm in putting the statement out on a mimeographed press release. The next move of course is up to the Doctor and blamed if we don't hope he has a lot of success with whatever schemes he gets under way. From what we have seen of some sections of the industrial east, coal is about all they deserve. Soft coal at that.

Then the last point is to require by law, use of the most efficient possible methods in production of carbon black, at present the biggest single industrial user of natural gas. That is fair enough; but we will say this, if the University of Texas crowd can get point four in operation first—making natural gas so valuable its owners will not sell it in cheap competition—point five will take care of itself. The carbon black processes have increased greatly in efficiency in the past few years and as a result higher prices have been made possible for gas going into that use. Maybe a new law would raise the average overall efficiency still more, but good old high priced gas would probably be just as effective.

Cost of the Plan

That's about all there is to the plan except the old you know what that comes at the end of any program—the bill; the touch, the tap or the bite as we sometimes say in non-academic circles. The layout will come to around $400,000 and some odd cents for buildings and equipment to house the work and the workers. That cost of course only hits the state once, then the annual charge on top of that is figured at another $400,000. It just happened to stop on four both times—a thing that doesn't happen more than once in a million.

Anyhow its a plan. And it is a lot more dignified and sounds more promising than anything the Federal Power Commission has dashed off in the interests of conservation. And if it takes hold in Texas maybe the citizens of that independent commonwealth may be getting 10¢ average at the well head for their gas. And believe it; when that time comes they'll conserve the gas alright and it won't take any Washington bureau to show them that it is worthwhile.

Our advice to Texas—give Doc Schoch that first $400,000 check and let him get going. It takes time to do all he has cut out for his department and in the meantime gas is still flarin' wild in some parts.

GUEST EDITORIAL

SELLING IDEAS

By CLIFFORD JOHNSTONE

Managing Director, Pacific Coast Gas Association

"At that meeting he was struck for the first time by the endless variety of men's minds which prevents a truth from ever presenting itself identically to two persons. Even those members who seemed to be on his side understood him in their own way with limitations and alterations he could not agree to, as what he always wanted most was to convey his thought to others just as he himself understood it."—*Tolstoy "War and Peace."*

MR. Tolstoy said something there. It particularly appeals to us Democrats and Republicans in the U.S.A. who try so hard to govern ourselves by talk alone. And especially it appeals to trade association workers who, if they are to accomplish anything, must run the gauntlet of diverse interests, special conditions and honest difference of opinion among their colleagues.

These are exciting, confusing and disturbing times. The conduct of the war, reconversion, the Montgomery Ward case, the Henry Wallace appointment, the Roosevelt flying dog, all mean different things to each of us. We each judge them and form an opinion, and then we are startled to learn that our neighbor has formed a different opinion even though he reads the same newspaper.

It is like the Associations. We in the Gas Industry have built one of the best of our nation's trade associations. The accomplishments of the American Gas Association are many and outstanding, but each accomplishment was a battle from idea to realization and each one contains compromises, the ultimate effect of which no one can know. Then, too, many proposed projects fail and others receive official blessing against the judgment of large minorities and lose effectiveness thereby. The industry needs improved machinery for talking things over on a national basis and for selling national action to all units of the industry in all corners of the nation.

One cause of argument is due to geographical differences. The United States is a very large country and different sections vary greatly in climate, in natural resources, and in state legislative requirements. In consequence their viewpoints may well differ on many matters proposed for national action. Also each region has problems of purely statewide or regional interest which have no place in a national forum.

The answer to this is better, stronger and more active state and regional associations, and more of them.

These associations should work closely with the American Gas Association in matters of national importance. Their members should be A.G.A. members and they should serve as eyes, ears and mouth of the A.G.A., suggesting, discussing, educating, selling, approving, and finally effectuating broad national policies for the industry.

In addition they should serve to relieve the A.G.A. of detail matters not of prime national importance many of which it now attempts but in doing so serves, for the most part, as a regional association for a few northeastern seaboard states duplicating effective work being conducted by regional associations there and elsewhere.

There are many useful state and regional associations now affiliated with the A.G.A. However the territory of some is not clearly defined, the majority have no full time staff, many are utility associations of broader scope, and some regions have no associations at all. None of them work as closely as they should with the A.G.A. nor the A.G.A. with them.

It is the opinion of this humble individual that much good would flow from the A.G.A. adopting a policy of encouraging the formation and strengthening of regional associations and delegating to them a great deal of the detail now being attempted by so-called national committees. An example of the right way to do things is the action of the A.G.A. Committee on the Selection and Training of Sales Personnel which, in cooperation with Servel, Inc., held meetings in 10 scattered cities to explain its program. Where regional associations existed they were invited to cooperate.

The secret of success in a democracy, whether nation or association, is to tell everybody and listen to everybody. Ideas sold by this process will stay sold and be acted upon.

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SALES IN UNITS

HEATING	AIR CONDITIONING		TOTAL INDUSTRY
1,332,600	5,682	1940	1,338,282
1,505,900	42,641	1941	1,548,541
2,600,000	86,004	V-1	2,686,004
2,800,000	113,986	V-2	2,913,986
2,990,000	138,000	V-3	3,128,000
3,290,000	170,340	V-4	3,460,340
3,615,000	197,840	V-5	3,812,840

CHART 1

SALES IN DOLLARS

(000 OMITTED)

HEATING	AIR CONDITIONING		TOTAL INDUSTRY
119,470	3,095	1940	122,565
137,086	17,247	1941	154,333
252,535	35,593	V-1	288,128
272,630	48,310	V-2	320,940
289,601	58,923	V-3	348,524
316,505	71,349	V-4	387,854
346,262	84,060	V-5	430,322

CHART 2

Evaluating the Postwar Market for HEATING AND AIR CONDITIONING

By RALPH C. CAMERON

Director of Merchandising, Airtemp Division, Chrysler Corporation

THE five years that will follow the German war we look upon as: V-1, V-2, V-3, V-4, V-5. V-1 is an eighteen months period which allows us some six months for reconversion, and the others are normal 12-month years. We base them against 1940 and 1941 facts as being the two years preceding the war where, as yet, we have not felt the influence of the war.

The assembly of these data took three of us about a year and a half, and we went to many places, and are indebted to many people and associations. We found many figures, we found many sets of figures; we had difficulty in making the earliest sets fit one another, and much of our work was to search out what we believed to be the basic and sound facts, because, you see, we were planning for our own business, planning on making a "blue clip" investment in this business; as to whether or not it was wise, and if so, how far we should go. Therefore, these are conservative figures on which factories are built, and not the more optimistic figures on which sales and advertising programs are sometimes set.

THE HEATING STORY

I will give the answer first: (Chart 1) Expressed in units, first, the heating figures. There were in 1941, 1,505,900 heating units made by the industry as a whole. In cooling, some 42,641 air conditioning units were made. This gives a total, in the right-hand column, of better than 1,500,000 units.

The industry's figure embraced that segment of the industry for which we will compete. For instance, in air conditioning they do not include centrifugal machines, since you do not make them now, and we do not plan to in the future. In boilers, they include only the residential type, and not the larger ones. So with that qualification we are ready to proceed.

Then comes the war years, and we disregard them, and move over into the postwar years, V-one, V-two, V-three, V-four and V-five.

This is our estimate of the growth in these lines of businesses the minimum growth, conservative figures. The heating business in units, according to our estimate, will better than double. The air conditioning units will go quite a few times more than that.

Now, using 1940 dollars and 1940 prices, (chart 2) neither of which will be any good after the war, but, nevertheless, to give us a measuring stick in dollars, we see a business growing, at manufacturers's billing prices to dealers, of $154,000,000 in 1941 to $430,000,000 at the end of the fifth year.

Bear in mind that the prices are the amount the dealers bill. The ultimate consumers prices are two and a quarter to two and a half times these figures. It is a *sizable* business.

WHAT IS THE Potential of heating and air conditioning postwar? In 1941 there were produced and marketed 1,505,000 units in heating; 42,641 units in air conditioning. Mr. Cameron believes that at the end of the fifth year of peace these figures will change to 3,615,000 units in heating; 197,840 units in air conditioning. This article is a summary of how he arrives at those figures. It was prepared from an address given before the Open Forum of the Indoor Climate Institute held in Detroit in 1944.

V-1 Heating Market

If in V-1 the prediction of 900,000 homes to be built comes true, and if half of them buy central heat, 450,000 then the number of new homes with central heat represents 32%, and 1,400,000 units becomes the V-1 goal. This figure is arrived at as follows:

HEATING MARKET

SUMMARY OF INDUSTRY UNITS

(000 OMITTED)

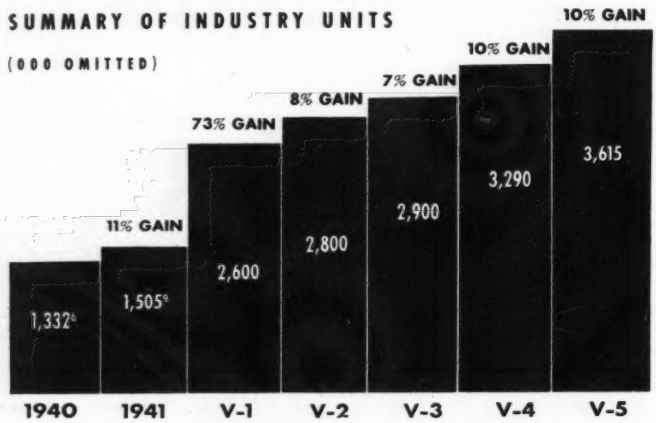


CHART 3

HEATING MARKET

SUMMARY OF INDUSTRIAL DOLLARS

(000 OMITTED)

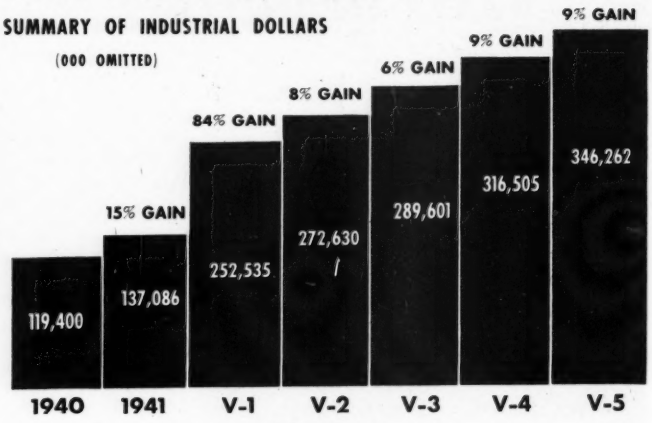


CHART 4

NORMAL MARKET IS—

Replacement	68%
New	32%

FOR EXAMPLE IN 1940—

545,000 new homes were built
272,500 or 50% with central heat

BUT IN 1940—

671,000 central heating plants were sold

Of which 272,500 went into new homes
398,500 went to replacement

SO—

IN V-1 IF—

900,000 new homes are built 50% or 450,000 will use central heat (if present trends continue).

The number of *new homes* with central heat representing 32% of needed production (central heat) which should total 1,400,000 *central heating plants*—

In our estimation 85% of the homes to be built will cost under $6000. And broken down, 25% will cost under $3000, 30% in the $3000 to $4000 class, 30% from $4000 to $6000, and this is the price of the home not including the lot. And then rich folks live in other brackets. Table 1.

In 1940 the heating sales were divided as follows:

Oil-fired	13%
Gas-fired	30%
Coal-fired	57%

WARM AIR HEATING

127,000 forced air
394,000 gravity

521,000 total

AUTOMATIC FURNACES

Oil	52.7%
Gas	21.8%
Stokers	25.5%

Notice the coal-fired is 57%; a sizable percentage forced warm air, that began in 1930 to mean something, and each year increased to get a little larger percentage of the total market, and of those that sell the automatic type of heat one can see that oil led, with stokers a strong second.

V-1 MARKET FOR CENTRAL HEAT

NEW HOMES BY PRICE CLASS	% BY PRICE CLASS	% CENTRAL HEAT	% VALUE HEAT	$ FOR HEAT	HEAT LOSS (000)	NEW HOMES TO BE BUILT (000)	NO. TO BE SOLD CENTRAL HEAT (000)
Under $3,000	30	10	3	90	35-50	270	27
3,000-4,500	18	40	4	140	50-75	162	65
4,500-6,000	12	65	6	315	75	108	70
6,000-10,000	30	77	8	640	75-100	270	208
Above 10,000	10	90	10	1,000+	Over 100	90	80
SUB TOTAL	100	50				900	450

REPLACEMENT HOMES	% BY PRICE CLASS	% CENTRAL HEAT	% VALUE HEAT	$ FOR HEAT	HEAT LOSS (000)	EXISTING HOMES (000)	EXISTING HOMES CENTRAL HEAT (000)	NO. TO BE SOLD CENTRAL HEAT (000)
Under $3,000	54	23	5	150	35-50	18,900	4,353	288
3,000-4,500	17	50	6	225	50-100	5,950	2,000	133
4,500-6,000	11	70	8	460	100	3,850	2,700	180
6,000-10,000	11½	80	10	800	100-150	4,025	3,240	214
Over 10,000	6½	90	12	1,200+	150+	2,275	2,050	135
SUB TOTAL	100	42				35,000	14,343	950
TOTAL	100					35,900	14,343	1,400

TABLE 1

Home Heating Today

Considering the way America heats its homes today, we find that of 35,000,000 homes, almost 58%, 19,000,000, still have stoves, or some other type of antiquated heat. That is a substantial undeveloped market for automatic heat.

Now, of those that do have central heat in the home, their affiliations so far have been about equally, divided between wet heat and warm air.

Now, of the 14,000,000, homes with central heat, 70% of those are still hand-fired by coal, and, there is, we believe a large potential market for automatic heat.

Of those who have central heat, and automatic heat, in their homes, up to now the oil people have done the greatest job, with gas second, and the stokers coming from behind, but coming rapidly.

It is interesting that 68% of potential volume is in the existing homes. It is interesting to know that 29,000,000 existing homes are over 10 years old, and we are particularly interested in the home that is somewhere between 17 and 20 years old, at which time the central heating plant usually needs replacement.

It is also interesting to note that the State Fire Marshal's report points out that three-quarters of the 736,000 fires in 1941 which cost 10,000 lives and $325,000,000 were by faulty heating. A better story to promote than the vitamin story, isn't it?

Sales By Desire

Well, 68 to 70 per cent of our business is coming to us from the existing homes. Now come sales by desire—up to this time sales by necessity have been the motivating force that caused most of our sales in this market. In other words, a man put in a furnace when his old one broke down. It is possible, with the up-to-date heating plant, with an able sales force, that we may have replacement by desire before absolute necessity makes the change necessary.

TABLE 2. FACTORS INFLUENCING POSTWAR HEATING SALES

1. New building boom.
2. Replacement backlog.
3. Revitalized dealer structure. One-third dealers die every two years. In wartime death rate normal, birth rate less.
4. Publicity and educational program. ICI-producers council.
5. Dollar income as great as 1929. Fewer rich, more middle, fewer poor.
6. Normal population growth.
7. Acceptance automatic heat.
8. Rural electrification.

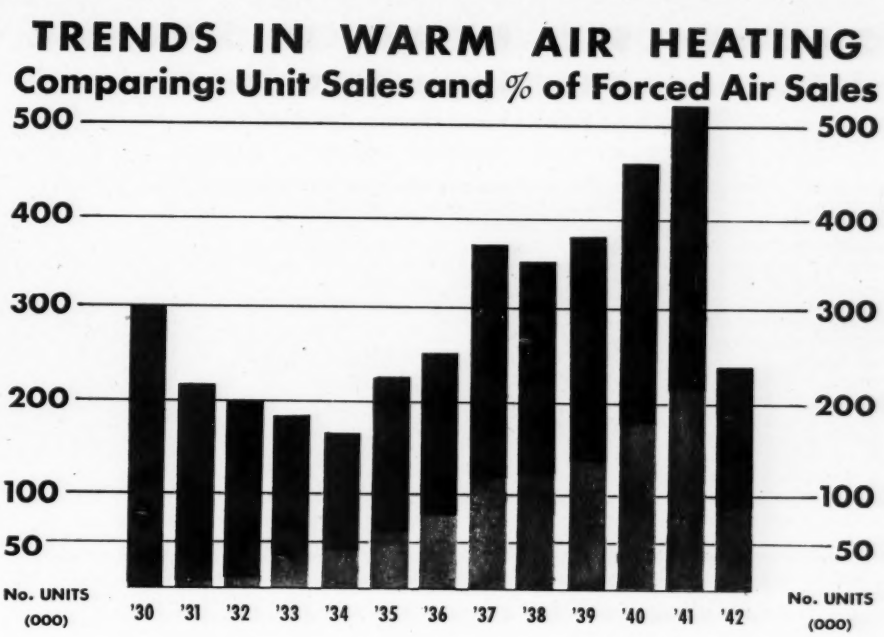


CHART 5

We stated above that 900,000 homes might be built in V-1. We point out in 1925 there were 937,000 homes built. It has happened and it can happen again. We think it will. We point out also that in the depression year of 1933, there were 54,000 homes built. Since 1933 there has not been enough homes built to satisfy the normal wants of the country, and therefore there is a large back-log being built up. There are about 500,000 family formations per year. Homes should be built for them, and haven't been for some 10 years.

In steam and hot water we predict a growth over the five-year prewar period in the five years after Victory. A growth too in conversion of oil burners, a growth too in stokers, a good sizable growth. But, in our opinion the largest growth will be in the warm air furnaces. In 1930 forced warm air began to take an increasing segment of the warm air heating market, and chart 5 shows that during the years that segment has been increasingly larger until the war. The factors that we think will influence the postwar heating market for the industry are shown in Table 2.

The Farm Market

Out of the 7,000,000 plus farms there are today, some 2,000,000 that are electrified. Immediately after the war plans are laid for expanded rural electrification to embrace another 2,000,000. So for our purposes the farm market doubles in size from 2,000,000 to 4,000,000.

Here is the farm market. There are 7,000,000 homes, roughly 2,000,000 of them wired. And, 44% of them are near power houses that will be quickly able to have electricity, and when that time comes the wife of the farmer, now having had a good income for some years, will no doubt want the benefit of automatic heating, and *can have it with the electric controls.*

To summarize the heating story: In 1940-1941, for central heating plants, expressed in units, we had a sizable growth. We predict the first year following the war a tremendous growth, an increase of 73% over a normal year. And then a normal gain of 7 to 10% in the years following the war. A slight recession in the third year.

AIR CONDITIONING

Air conditioning started in industry. It was there it made its first great rapid strides. Then commercial installations went to town until there were approximately 10 times as many such installations as in industry. The most recent comer to the field has been the home. That is our primary interest now.

Before the war, as far as residential air conditioning is concerned, it fell in these two main classes, room units and the central type. Then it cost $250 to $300 to put a room unit in the average bedroom or office or living room, and I think, frankly, it can be said that it did not do such a terribly good job. In many instances it was noisy, and in many instances not quite big enough to give complete

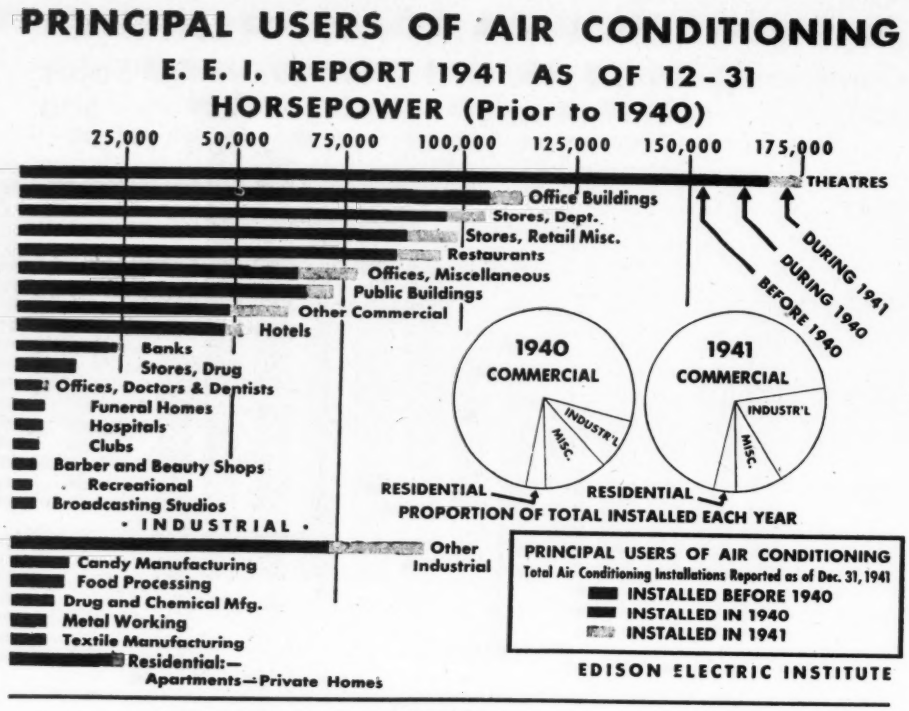


CHART 6

7 1/10% OF 35,000,000 FAMILIES EARN $5,000 PER YEAR OR MORE

Suppose only ½% of this group (or 13,500) can be sold Residential Air Conditioning by Industry in V-1.

INDUSTRY YEAR	HOUSEHOLD REFRIGERATION UNITS	SALES AVERAGE PRICE	INDUSTRY RESIDENTIAL AIR CONDITIONING YEAR	UNITS
TO 1920	10,000	600		
1921	5,050	550		
1922	12,000	525		
1923	18,000	475		
1924	30,000	450		
1925	75,000	425	V-1	13,500
1926	210,000	390		
1927	390,000	350		
1928	560,000	334		
1929	840,000	212		
1930	850,000	215		
1931	965,000	258		
1932	840,000	195		
1933	1,080,000	110		
1934	1,390,000	172		
1935	1,722,000	106		
1936	2,222,000	104		
1937	2,559,000	171		
1938	1,430,000	172		
1939	2,085,000	169		
1940	2,780,000	164		
1941	3,700,000	161		

CHART 7

satisfaction, although it was better, of course, than none.

Then came the time when a warm air furnace and a "packaged" cooling unit could be put together in your basement. The air goes from the house through the duct, across the fan and filter and is heated and returns to the house. In the summer time the air is detoured across the coolant coils, where it is dehumidified and cooled and returned to the living quarters.

The following prices are not typical of the industry, but they are typical of our company. In the new house $1500, prewar, delivered a complete new heating and cooling plant, with these four basic fundamentals for real air conditioning: (1) filtration; (2) circulation; (3) de-humidification and cooling in the summer time, and (4) in the winter time adding the proper humidity and heating. I think we have quite a few of those out that were installed for less than $1000.

Now, if one was fortunate enough to have a heating plant in, the duct work in, then for from $750 to $900, and in many instances as low as $500, the cooling package could be added to an existing furnace installation.

So after some years of field experience, we believe that we are on the way to a new market, in residential air conditioning that may in some respects surprise a lot of us. We are indebted to the Edison Electrical Institute for the results of their survey in 1940 and again in 1941, to show us who the customers were and the relative volume.

Air Conditioning Users

Expressed in horsepower, chart 6, are the number of horsepower sold to date to the various classes of buyers, the theatre being the first and most important.

It is our opinion that a better quality of postwar air conditioning, a more packaged product, something put together at the factory, carefully engineered and inspected, may lead the American public to buy waste quantities of air conditioning for the home. It may follow the same pattern as the domestic refrigerator market. See what that would be if it did, chart 5. There are roughly 8% of the 35,000,000 homes in this country who earn $5000 a year, or more, and it seems to be reasonable that .005% of that particular group might, the

TABLE 3. FACTORS INFLUENCING POSTWAR AIR CONDITIONING SALES

1. Widening public acceptance.

2. An organization as able to engineer and install, as it is to make a good product. The industry will tend toward products put together at the factory under controlled methods of inspection and manufacture.

3. New industrial applications. Industrial processing air conditioning has proved its worth. It isn't a question of "Do they want it?" It is a question of, "How soon can they get it?"

4. The residential air conditioning promotion we believe will have to be joined in by many manufacturers.

5. Public utility sponsorship. Both the gas industry and the electric industry will be very happy to see the ICI come to them with a story of where they can sell tomorrow's industrial load. They would like very much to sell it to the residential customer at a higher rate. It is highly possible. They will be so interested in that movement that they will join hands with ICI to see that a good job is done.

6. The ICI educational program is the foundation and basis on which this movement will go forward. A better trained dealer organization will be the thing that we will need to put this industry over.

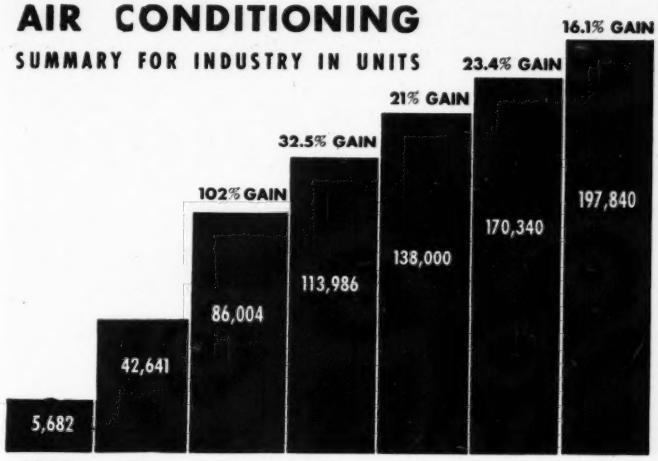


CHART 8

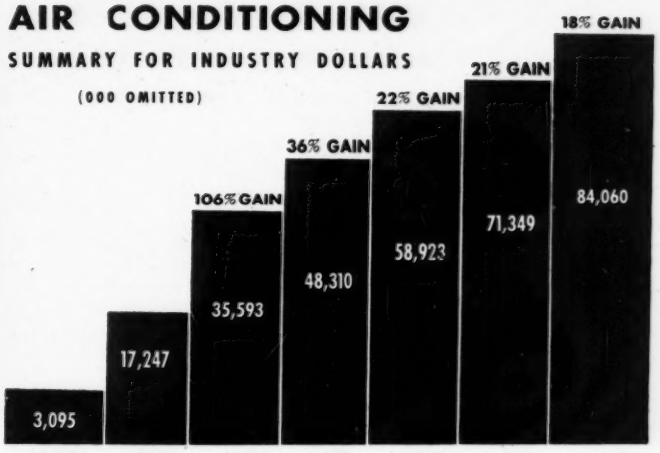


CHART 9

first year after the war, be interested in buying year 'round air conditioning for their homes. This gives us a minimum figure of 13,500. (Chart 7)

Comparison With Refrigeration

To have a figure in mind, we set that over in the right-hand column as a V-1 industry potential. Most people who have seen it say it is too little. Possibly it is. But, let's see where it stacks up with the domestic refrigerator business.

From 1910 to 1920 it took the industry 10 years to sell 10,000 units, and the average price was $600. In 1921 better than 5000 were sold, and the price dropped $550. From 1921 to 1941, the volume went from 5000 to 3,700,000 annually. The price line dropped from $550 to $161. Note that year of 1926, when General Electric and others came into the market and made a real investment in this business; it was in those days that 414 manufacturers were making roughly somewhat less than a quarter of a million units per year. Today or in 1941 it was 3,700,000 units per year. The product being offered at $161 is a far superior product to the product that cost $550 in the good old days of 1926.

Therefore, we visualize a set of figures in the right-hand column that follows the pattern of the electric refrigerator business. In 1922, the first families to buy radios, or anything new, were willing to lay $500 on the line for a refrigerator, which was not to be compared with the one today, in quality or performance.

Do you think those same families will be willing to lay roughly $500 on the line for year 'round comfort, to give them summer cooling and dehumidification so they may have indoor climate controlled properly for the summer months? It seems to us that that is where most things start, with the apex of the triangle of most markets, with the folks who can first afford it.

If that could happen, then we can visualize a large column of figures under the 13,500, making it match up with the 3,700,000. At the same time, we see the price column diminishing at about the same rate as in the domestic refrigerator market.

The industry was just getting its stride when along came the war, and of course stopped things for a time.

We believe the factors that will influence the postwar air conditioning business are as listed in Table 3.

Charts 8 and 9 summarize units in air conditioning for the two years before the war and five years that follow the war. Does it not seem reasonable that these figures are not only attainable, but they are a minimum and will undoubtedly be exceeded? That is our opinion. Both in units and dollars. Although, as to the dollars, there is some question about what the price levels will be in the early postwar years.

And finally, take one more look at the combined picture: 1,505,000 units in heating, 42,641 units in air conditioning, in 1941, growing, at the end of the five years, or the end of the fifth year until we have a business of 3,615,000 units in heating and 197,840 units in cooling.

In regional meeting in Portland, Ore, 70 key men representing seven Pacific Northwest gas utilities and various manufacturers heard the program for the selection and training of domestic gas salesmen sponsored by the American Gas Association in cooperation with Servel, Inc. The meeting, eighth in the national series, was held under the auspices of the Pacific Coast Gas Association. Pictured from left are: **R. G. Barnett,** A.G.A. director and vice president and general manager of Portland Gas & Coke Co.; **C. A. Miller,** of San Francisco, Servel regional sales manager; **Dr. Robert N. McMurry,** Servel sales training consultant; **R. J. Canniff,** Servel advertising manager; **R. E. Williams** of Binghampton, N. Y., chairman of the A.G.A. program; **C. W. Steele** and **Fred M. Kimball**, both of the Portland utility.

There's *Magic* in Gas

By H. VINTON POTTER

Director, New Freedom Gas Kitchen Program

Model Kitchen at Peoples Gas Light and Coke Co., Chicago, with Rhonda Fleming, Selznick starlet, appearing in "Spellbound" with Ingrid Bergman.

EVERYONE is expecting amazing new developments in the postwar era.

So many wonderful things have come as a result of war-time research that folks generally are carried away with the thought of miracles that will become commonplace. Much of this is wishful thinking and manufacturers are worried by the so-called "stratosphere thinking" that has carried people out of this world and is conditioning their minds for an era of miracles. People will no longer be satisfied with the ordinary, and suppliers will be struggling for some device whereby they can tie-in their products with electronics, Robot controls, and other fantastic devices to add a note of modernity to strengthen selling appeal.

Much debunking must be done between now and the time new appliances are available, for we all know that the equipment which will be ready immediately after victory will be dressed up models of those things we had when the war called a halt to civilian production, and even after that the fantastic will give way to a more rational line of thinking.

One thought is certain, however, and that is that we must recognize the superiority of our fuel and romanticize it to the point where folks will recognize the wonderful things it can do and mentally catalogue it as the fuel of the future and not of the past.

It is this sort of thinking which prompted the Postwar Planning Committee of the American Gas Association to start now with a program that would weave around our gas flame an "aura of magic" and from that point proceed with a program that would show people generally that gas will contribute much to happy living.

Gas companies generally recognize the responsibility they owe the more than 20 million customers now cooking with gas to bring to them the best appliances available, to blend them into an attractive picture that will show gas at its finest, and to provide the answer to the universal desire for the best in modern living.

It has been my pleasure recently to talk with gas company executives in all parts of the country and everywhere I find an enthusiasm for the New Freedom Gas Kitchen Program which has become the symbol of the use of gas in the modern home.

Not only does this program provide us with an opportunity to talk with our customers about gas for cook-

THINGS TO DO NOW TO PROMOTE THE NEW FREEDOM GAS KITCHEN PROGRAM

SETTING UP AN ORGANIZATION

1. **Place responsibility. Whether it be sales manager, a separate activity reporting directly to top management, home service, or whatever method suits the individual company best, place responsibility now.**
2. **Remember that the aims of the program cannot be accomplished, if it becomes merely another duty to be taken on by some already overloaded department.**
3. **In deciding whether this activity should become a function of the sales manager or home service, remember that both the masculine and feminine viewpoints are necessary. The men have the builders' viewpoint and know the dealer angle. The women can add the dainty touch that appeals to women—the ultimate purchasers.**

GETTING READY TO SELL

4. **Impress dealers with the fact that the gas industry has a plan, a program, and the kind of merchandise that will please customers and ring up dollars in their cash registers.**
5. **Tell your consumers that the gas industry is at work on plans that will guarantee them happy living in their homes of the future. While such impressions can be created at the national level through cooperative advertising, it remains for the local utility through local media and methods to capture the imagination of the customer.**
6. **Let architects and builders know that the gas industry is interested in their problems. Tell them that we will have an answer when merchandise is ready for sale.**

ing and refrigeration, but it also gives us a chance to consult with them about their water heating needs and the desirability of gas for winter or even all-year-round air conditioning. Invariably such consultations also lead to the utility room or laundry room where again we can tell about our amazing new gas clothes dryer and the need for oceans of hot water for automatic washers. Thus it is that gas company executives recognize the need for an active promotion of our kitchen program, as it brings them close to their customers who are looking for guidance in achieving better postwar living.

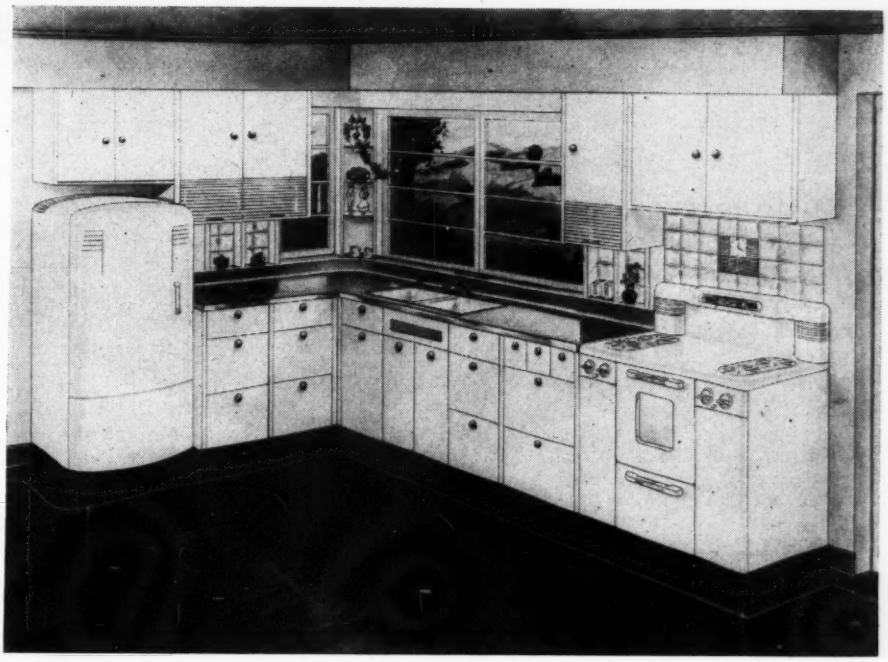
No one questions our objectives nor do they question the crying need for a program of this sort, nor do they question the fact that the program is interesting and makes them wish the time were at hand when something could be done with this activity. However, there is a question in their minds as to what can be done *now* to prepare the way for future merchandising activities.

Well, there are many things that can be done now. Right here let me say that it is not the policy of the Committee to say how the activity should be conducted locally. A few suggestions appear in the accompanying table.

Selling Action

Another question that comes up is "How shall we sell New Freedom Gas Kitchens—shall we sell them ourselves complete in every detail or shall we select dealers who will work closely with us and depend upon them to do the merchandising job under our encouragement?" Again, this depends upon your own local views and your own solution will be prompted by your realization of the need that exists for aggressive action and the way you feel it can be interpreted locally into the most aggressive action.

In Chicago the Peoples Gas Light and Coke Company for many years have been giving outstanding help to its customers in the matter of good kitchen design. It has been their thought that if customers would first look to the gas company as a source of the best information on the subject there would be little chance for such prospects to be lost to competition. In Chicago customers are encouraged to come to the local gas company for helpful suggestions and the right information as to how to lay out their new or remodeled kitchen, then the job is turned over to a local dealer who completes the work under gas company supervision, so that the job will satisfy the customer and measure up to the high standard set by the utility.



Model kitchen designed by Tappan Stove Company

Other companies where no local merchandising is done by the utility, will probably set up a kitchen planning department whose duty it shall be to know the best kitchen planning practices and to educate dealers in that knowledge. Here the utility, while not actually merchandising, can create the desire among the customers, and then be sure that local dealers will be well prepared to furnish prospects with the best possible kitchens available. One of the most important aspects of such a utility organization is the chance it will have to work with architects and builders and stimulate their thinking to the point where only gas kitchens will be specified, even though the ultimate sales are made by the local dealer. At least this kind of a plan will assure the coordination of all effort and guarantee that all dealers will tell the same kind of enlightened story and that all customers will have access to the best information obtainable.

Then there are other companies who will not only merchandise the complete kitchens but will take care of all the essential details, subletting contracts for painting, alterations, etc. and finance the complete job on a single sales order. From what we know of plans now in the making, several of our manufacturers will have complete kitchen packages, which will be available after the war, and which will encourage the local utility to merchandise kitchens because of the simplicity of the work involved. Such a tie-in when worked with gas company leadership and dealer cooperation will inevitably produce a high type of kitchen installation.

Until such time as merchandise is again available, the gas company will find many things to do in preparation for the unremitting effort to which they must look forward. (See Table).

Plan Book

Without going into all of the steps that should be taken, let me say that shortly a plan book will be available from the American Gas Association, which will outline the steps to follow in the three phases we must pass through as we prepare for the "battle of the fuels". Suffice it to say that even now no time can be lost in laying the ground work for we must be ready to move fast when the time comes and no waste motion can mar our progress.

Much satisfaction will be found in the prompt response the gas industry has given to the raising of the promotional fund, which will provide for continuing research in gas production, distribution and utilization and in addition will provide extra money for national advertising and sales promotion. To have completed this ambitious program in less than 90 days is eloquent testimony to the alertness of the gas industry and evidence that we face the future with confidence and vigor.

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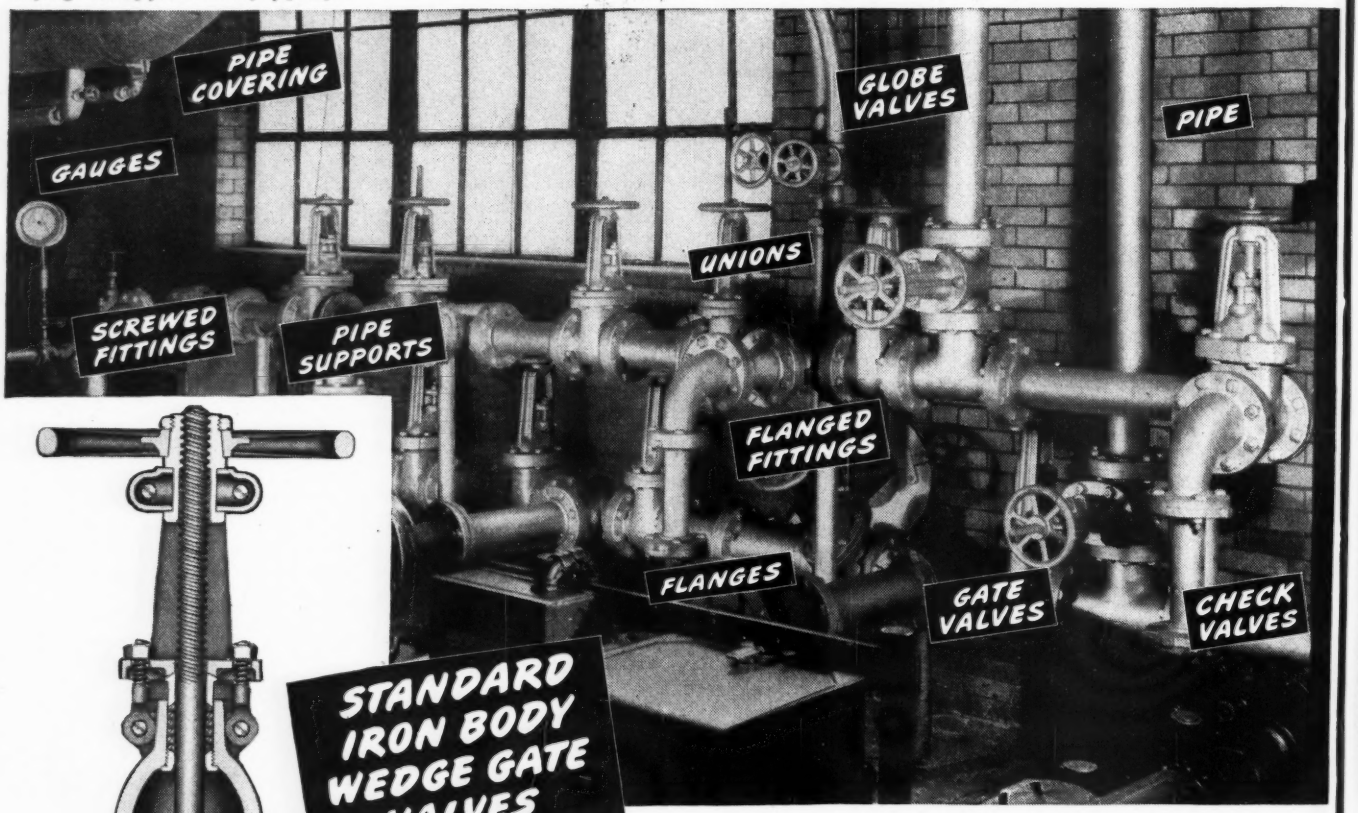

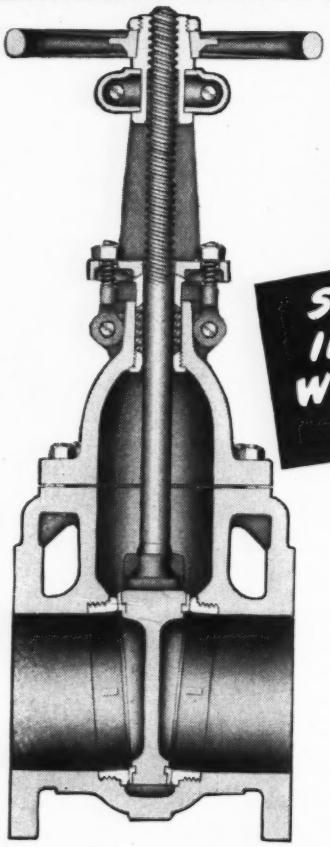

STANDARD IRON BODY WEDGE GATE VALVES

SERVICE RECOMMENDATIONS: **Crane Standard Iron Body Wedge Gate Valves** with Brass trim are recommended for steam, water or oil lines; all-iron valves for oil, gas or fluids that corrode brass but not iron. Made in O. S. & Y. and Non-Rising Stem patterns.

Working Pressures

Size of Valve	Screwed or Flanged Valves		Hub End Valves
	Saturated Steam	Cold Water, Oil, or Gas, Non-Shock	Cold Water or Gas Non-Shock
2 to 12 in.	125 pounds	200 pounds	200 pounds
14 and 16 in.	125 pounds	150 pounds	150 pounds
18 to 24 in.	*	150 pounds	150 pounds

*For steam lines larger than 16-inch, Crane 150-pound Cast Steel Gate Valves are recommended.

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New England Gas Association's Study of Seven Factors Affecting

THE ECONOMICS OF SALES

THE second of a series of Company Managers Conferences held by the New England Gas Association during the 1944 Association year to study the fundamental problems of the New England gas industry, was attended by 53 persons at the Parker House, Boston, on Dec. 1, 1944.

The usual procedure was followed in handling the meeting. President Hall M. Henry presided at the morning session, with Chairman R. J. Rutherford of the Company Managers Conference Committee presiding at the afternoon session.

After presentations by the seven selected representatives of the Sales Managers Conference and prepared discussions by seven representatives of the Company Managers Conference together with floor discussions, definite conclusions and recommendations were reached on the seven factors dealing with the Economics of Sales. These are briefly summarized in Table 1.

The following constitutes the conclusions and recommendations prepared by the seven Sales Managers Conference representatives, some of the recommendations having been revised by the Company Managers Conference.

MARKET STUDIES

Presented by E. G. TWOHEY, Assistant distribution Manager, Central District, N.E.P.A., Worcester. Prepared Discussion by R. E. RAMSAY, president, New Haven Gas Light Co.

Conclusions

A market study is essential to the development of a sound sales program.

Recommendations

Complete market surveys should be made by every gas company, such studies to cover as many of the following subjects as each company believes to be of value in its own situation:

1. Complete market surveys, designed to indicate the saturation of various gas appliances and the extent to which the market is supplied by different fuels.

2. These surveys should be repeated at appropriate intervals.

3. Mcf and revenue trends by classes and districts indicating where gas consumption is increasing or decreasing.

4. Public opinion surveys.

EVALUATING NEW BUSINESS EFFORTS

Presented by J. A. HILLER, sales manager, Portland Gas Light Co. Prepared Discussion by D. H. LEVAN, President and General Manager, Lowell Gas Light Co.

Conclusions

The operating report is unreliable as the only measure of the New Business results.

Recommendations

1. A detailed study should be made by each company to determine the estimated average gas load and revenue obtainable from appliances on its lines.

2. A tabulation of estimated Mcf and revenue gains on appliance sales should be incorporated in each company's accounting procedure.

3. Each company should prepare charts based upon these previously determined characteristics showing the number of appliance unit sales necessary to obtain a given increase in Mcf and revenue per customer per year.

4. Management should determine and assign to the New Business Department the increase in Mcf and revenue desired in a given year.

5. Estimated Mcf and E.A.R. for specific appliances should be checked from year to year to detect changes in characteristics.

6. A periodic comparison should be made (at least annually) of estimated gains with actual increases.

7. (a) A record of known major load and revenue losses should be maintained and be given due consideration in evaluating New Business results.

(b) Consideration also should be given to the situation which would exist in the absence of new business efforts to offset such losses.

(c) Management should be constantly on the alert to detect revenue loss trends, the causes of which are not readily apparent.

(d) Facilities should be made available for immediate revenue loss studies when unfavorable trends are first detected so that causes can be determined and corrective measures instituted by the new business department.

8. Each company should make studies to determine:

(a) Actual gains vs. estimated gains from extensions.

(b) Actual cost vs. estimated cost of such extensions.

SALESMAN POWER

Presented by R. E. WRIGHT, director of gas sales, Negea Service Corp. Prepared Discussion by E. H. EACKER, vice president, Boston Consolidated Gas Co.

Conclusions

1. Sales results are in direct proportion to the number of salesmen with due allowance for business con-

TABLE 1. FACTORS DEALING WITH THE ECONOMICS OF SALES

1.	**A detailed analysis should be made of market potentialities by each company.**
2.	**The operating report is an unsatisfactory means for evaluating New Business results and a suggested method might well be adopted by the different companies.**
3.	**There is a base minimum New Business expense which a company will have regardless of whether or not it wishes to increase revenues.**
4.	**The revenue life (not physical life) of refrigerators, water heaters and house heaters is at least 10 years. (In other words, a company can safely count on obtaining a minimum of 10 years of revenue from each such appliance which it sells.)**
5.	**The efforts of Home Service personnel, in addition to being effective and vavluable in building good public relations and showing customers how to get the most out of their appliances, can be measured by the increased revenues produced through their calls.**
6.	**Sales results are in direct proportion to the number of salesmen employed.**
7.	**Companies that spent above average on New Business showed better net operating revenue gains as well as gains in M.c.f. and gross revenues than companies that spent below average.**

ditions and for the point of diminishing return.

2. The amount of estimated annual revenue obtained per salesman year is approximately the same (in a given company) whether a salesman is assigned to 1500 or 8000 customers.

3. The fewer the meters per salesman, the larger is the amount of estimated annual revenue that can be realized per meter.

4. The fewer the meters per salesman, the lower will be the over-all New Business costs per dollar of estimated annual revenue added.

5. The best results (E.A.R. per customer and lowest cost per dollar E.A.R.) are being obtained with less than 2000 meters per domestic salesman and the same on heating.

6. Sales results can be budgeted in the relations to salesman power.

7. Salesman power is the one, positive, measurable force in an economical sales program.

Recommendations

1. Each company should determine what percentage of its total meters it wants to sell a given appliance or appliances or the amount of revenue it wants to add through the sale of appliances.

2. Each company should determine the average number of appliances per average year sold per salesman.

3. Each company should determine the estimated average annual revenue added per salesman through the sale of these appliances.

4. From the preceding factors, each company should determine the number of salesmen needed to do the job.

5. Each company should determine the additional cost of these salesmen.

6. Each company should determine the amount of money it can afford to spend to obtain new load through the sale of appliances and trim its sales to meet the pattern and then go to work.

EVALUATION OF HOME SERVICE

Presented by C. W. MOODY, sales manager, Cambridge Gas Light Co. Prepared Discussion by G. G. HOWIE, vice president and general manager Cambridge Gas Light Co.

Conclusions

1. Gas usage was greater in those homes where home service calls had been made than in those not contacted.

2. The costs of increasing revenues through home service compares favorably with those reported for domestic appliance selling.

3. Home service can well be justified because of the intangible values produced but it is interesting to know that it can be used to increase revenue at reasonable costs.

4. Home service contacts were responsible for some appliance sales but the load thus added was not included in these studies.

Recommendations

1. Make studies of home service activities to ascertain their tangible value.

2. Study carefully the desirability of adding enough home service personnel to contact each customer once per year.

REVENUE LIFE OF APPLIANCES

Presented by R. D. STUART, Jr., general merchandise manager, Blackstone Valley Gas & Electric Co. Prepared Discussion by P. J. REMPE, vice president, Stone & Webster Service Corp.

Conclusions

It is not known for how *long* each appliance will produce revenue because the appliances surveyed have not yet completed their full *revenue life span.* However, data has been obtained which indicates the *minimum* revenue life of appliances. It is certain that data will eventually show the minimum *revenue* life of these appliances to be several years in excess of the minimum period.

Recommendations

1. A period of at least 10 years represents a conservatively safe figure to use in calculating the "average minimum revenue life" of automatic water heaters, house heaters and refrigerators.

2. A corresponding figure for ranges is probably greater and should be determined by each individual company for itself.

3. Each company should compile its own data on the revenue life of appliances.

4. Each company should study the effects of its sales policies and rates on the revenue life of appliances.

MINIMUM NEW BUSINESS EXPENSE TO HOLD REVENUES

Presented by J. C. WILLIS, representing Brockton, Fitchburg & Springfield companies. Prepared Discussion by H. B. HALL, manager, Old Colony Gas Co.

Conclusions

1. There exists a "base" or "minimum" new business expense which a company will have irrespective of whether the company wishes to obtain additional revenues.

2. This minimum base or first new business expense approximates $1 per customer per year for any company, including New England companies.

3. Only those expenses in excess of this $1 "minimum" should be charged to acquire new loads.

Recommendations

1. Where possible, each company should determine its minimum new business expense, carefully justifying the methods used to calculate each item.

2. Where it is impossible to allocate total new business expense properly to "minimum" and "load building", the figure of $1 per total customer should be accepted as the minimum cost based upon extensive available data.

EFFECTS OF AGGRESSIVE NEW BUSINESS EFFORTS VS. PASSIVE ONES ON RESULTS

Presented by J. J. McKEARIN, manager of domestic sales, Boston Consolidated Gas Co. Prepared Discussion by JOHN WEST, president, Worcester County Electric Co.

Conclusions

1. Companies spending above average on new business show: (a) larger gains in Mcf sales; (b) larger gains in gross revenues; (c) larger gains in net operating revenues than for companies spending below average.

2. The larger gains in net operating revenues were obtained *after* absorbing the much larger new business expense per customer.

3. All Mcf and gross revenue gains are annual and should continue for a minimum of 10 years—based upon the report covering the revenue life of appliances.

Recommendations

1. To show greater-than-average gains in Mcf sales, gross revenues, and net operating revenues, a company should spend above average on new business per total customer per year.

2. The gains in Mcf, revenues, and net operating revenues vary to some extent due to the efficiency of sales organizations. A company should therefore, plan well for the selection and training of salesmen for the postwar period.

3. A company should prepare a similar study on its own property.

Detroit's Utility Tax Held Unconstitutional

Circuit Judge Joseph A. Moynihan ruled unconstitutional a Detroit city ordinance intended to authorize collection of an excise tax from the Detroit Edison Co. and the Michigan Consolidated Gas Co. He restrained the city from attempting to collect the tax.

Pending court rulings on the ordinance, the city had made no attempt to collect the tax. It was set at 20% of gross revenue, but was limited to the maximum that the company would have to pay in Federal excess-profits taxes.

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DRESSER COUPLINGS
for Plain-End Pipe

Texas University Issues Study of State's Gas Problems

THE Texas Railroad Commission held an informal hearing on Dec. 19, 1944 on the conservation of natural gas. There some citizens vigorously voiced their belief that gas exportation—if allowed to continue unchecked—will soon deprive Texas of this great resource. But attorneys conversant with the facts stated that nothing could be done by way of legal measures affecting exportation alone. While some valuable suggestions were made on the matter of gas conservation, no suggestion was made to solve the problem of a possible early depletion of Texas gas reserves.

At the end of the meeting Chairman Jester expressed the desire of the Commission to obtain written suggestions on this matter. In response to this invitation, the writer is submitting what he believes to be a diagnosis of the main cause of the present gas situation, and a plan for its cure. This plan is believed to be duly considerate of all interests involved.

Summary of Proposal

1. Gas to be used in large amounts (such as one hundred million cu. ft., or more, per annum) for purposes for which lignite or other cheap solid fuels can be used shall hereafter be excluded by the Railroad Commission from their estimate of *market demand* for public gas lines; but this provision should not be used to decrease the total volumes allowed for existing gas lines below the amounts they now carry.

2. The price to be paid to gas owners by pipe line operators shall be gradually raised from its present figure to a figure near or above 10¢, in accordance with the market demand as defined in the preceding paragraph.

3. To increase the market demand in Texas, there shall be instituted an effective program of industrialization aided by specific provisions for new industries, particularly those using clays, cotton, and natural gas itself as a material for manufacture.

4. Gas supplies such as those used for carbon black, and for oil lifting which are now disposed of through other means than "common carriers" should be given special technical study with the view of reducing unprofitable or wasteful outputs of gas.

These four actions will bring the following results:

(a) the total income of gas owners will be increased from $23,000,000 to $100,000,000 per annum;

(b) the length of the gas age will be made three to four times as long as it would be without such a procedure;

(c) pipe line investors will suffer no losses of income on their investment;

(d) Texas prices of domestic and commercial gas will not be increased—perhaps even decreased; and special industrial gas will be available at lower rates than in the North-Eastern states;

(e) the higher fuel costs which large industrial users will have to bear will not effect them substantially because even with lignite, the fuel item is only one-third of the total power cost. Furthermore, these large industrial users will be merely reassuming a cost which in the meanwhile is being carried mainly by the well owners, and in lesser degree, by the other fuel users.

Possible Legislative Actions Involved: The Railroad Commission may not have power to make the above distinction between "gas replaceable with cheap solid fuels" and all other kinds of gas: If so, legislative action thereon should be secured as soon as possible.

Procedure of Raising the Well-Prices: It is believed that the Commission has the power and duty to fix the prices which a pipe line should pay for gas offered to it by producers, and also, the power and duty to prorate the amounts to be taken from the different producers.

It is also believed, that the Commission has the power and duty to fix the prices to be charged for gas delivered: hence, if "cheap gas which now is replacing lignite" is no longer allowed as figuring in the *market demand*, then an increase in the volumes of gas used for the other uses will enable the Commission to raise the well-price and with it the price for industrial gas without disturbing the price of domestic or of commercial gas; and this procedure will gradually eliminate the use of gas which is replacing lignite. This procedure is strictly in accordance with the practice in the industrialized North-Eastern part of the United States, and hence, both legal and beneficial. If any legislative action is necessary to carry out this program, then steps to do this should be taken promptly.

"SOLUTIONS OF TEXAS GAS and Industrial Problems" is the title of a booklet distributed by the University of Texas at Austin. Authors are E. P. SCHOCH, F. K. PENCE and SIMON WILLIAMS, directors of research on natural gas, ceramics, and cotton respectively, for the University's Bureau of Industrial Chemistry. The booklet is divided into six chapters, four of them by Dr. Schoch. Of greatest interest to the gas industry are chapters 1, 5, and 6, which take up respectively the Texas gas problem—its solution by means of Industrialization and the use of Lignite; New manufactures from natural gas—Methane as Raw Material for Plastics, Rubber, and Chemicals; Some Comments on the State's Gas Business—Based on Gas Statistics and Tax Records—also Recommended Legislative Action. An excerpt from the book is presented herewith.

Canada Needs Texas Gas States Ontario Official

Natural gas resources in the Candian province of Ontario will be exhausted in five years, according to Col. R. B. Harkness, natural gas commissioner for the province, who states flatly that the only permanent supply solution is importation from the United States.

Col. Harkness made these statements to municipal engineers from the cities of Windsor, London, Chatham and Sarnia, who conferred with the commissioner in Toronto on Jan. 17 on problems arising from a request by Union Gas Co. of Canada, Ltd., for an upward revision of rate schedules. Col. Harkness estimated that Texas fields could furnish an unlimited amount of natural gas to Ontario for the next 50 years.

Incidentally, it now is reported that Dominion Natural Gas Co., which serves about 44,000 customers in numerous communities, including the cities of Brantford, St. Thomas, Galt, Preston and Kitchener, may enter into an arrangement with the Union Gas Co. for some of the gas which Union proposes to import from the United States.

Proposed Pennsylvania Rate Increase Delayed

Public Utility Commission in Harrisburg, Penn. has delayed for six months the proposal of the Equitable Gas Co. in Pittsburgh to increase its gas rates to its Western Pennsylvania consumers.

Meantime, Pittsburgh Democratic Senators Holland and Barr have presented the Pennsylvania Senates' Public Utility Committee with a resolution applying to gas rates charged by natural gas companies in Western Pennsylvania, that the legislature set "just and reasonable rates" for public utility rate payers.

Sorby Article in "Red Barrel"

The January issue of the "Red Barrel," published by the Coca Cola Co., contains an article (p. 22) on tomorrow's kitchens by Carl Sorby, vice president of the George D. Roper Corp. This publication has a wide circulation throughout the country.

CONSERVATION OF CANADA'S GAS

Repressuring and Gathering Facilities Completed in Turner Valley Field

By ROBERT W. CLARKE

GAS, Canadian Correspondent

WORK is proceeding quite rapidly in the Turner Valley gas and oil field on gas gathering installations ordered by the Alberta government under the Natural Gas Utilities Act, passed last March, and with the dual purpose of eliminating gas wastage and extending the life of the field.

Through the past year, *GAS* has reported most, if not all, of the steps leading up to and beyond the passage of the act but to aid in a better understanding of the entire undertaking, it is undoubtedly advisable that a summarization be provided.

The act, assented to March 24, 1944, specifically opened the gas market to all producers with the gas to be handled on a utility basis at prices to be fixed by the Natural Gas Utilities Board. Previously, the gas market from Turner Valley had been controlled by Royalite Oil Co. through an exclusive contract with the gas company supplying gas to Calgary, Edmonton, Lethbridge and intermediate points.

In July, 1944, the board issued three orders:

1. Instructing British American Oil Co., Ltd. to put in a plan of gathering of low pressure gas and re-pressuring machinery.
2. Directing the Madison Natural Gas Co. (successor to Royalite) to construct works to connect with the B-A layout.
3. Ordered Madison to construct works to tie in with Gas & Oil Products, Ltd. set-up.

That, in brief, fills in the background and allows us to proceed with the main theme of this article—a review of the extensive operations either consummated or contemplated by B-A Oil.

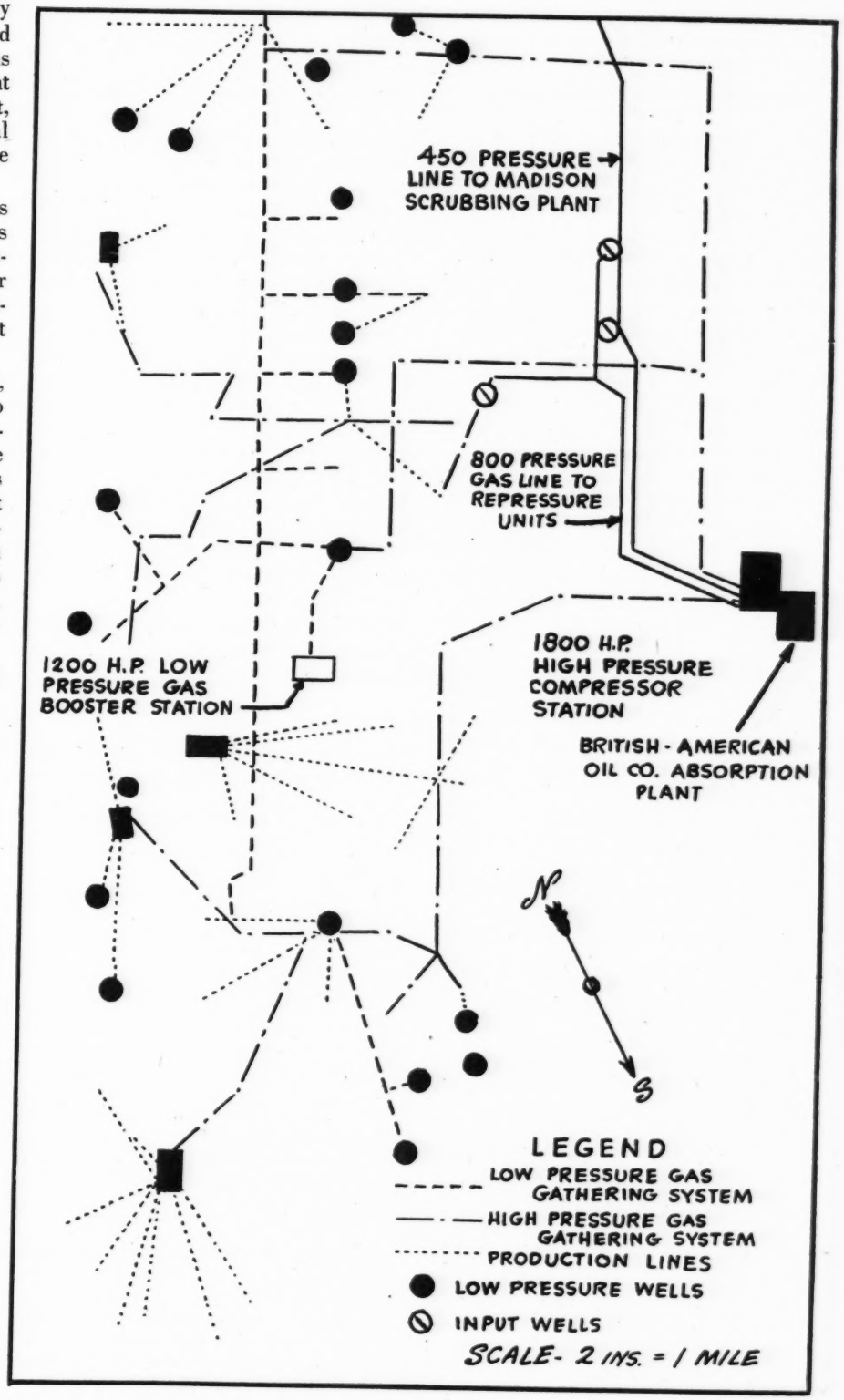
B-A was instructed to handle the gas from the southern portion of the field, and it is estimated that the cost of B-A installations will approximate $500,000.

The B-A plan involves the following:

(a) A low pressure gas gathering system;

(b) A booster station for recompressing the gas from 10 to 150 lbs. pressure;

(c) A high pressure compressor station to recompress the residue gas


450 PRESSURE LINE TO MADISON SCRUBBING PLANT
800 PRESSURE GAS LINE TO REPRESSURE UNITS
1200 H.P. LOW PRESSURE GAS BOOSTER STATION
1800 H.P. HIGH PRESSURE COMPRESSOR STATION
BRITISH-AMERICAN OIL CO. ABSORPTION PLANT
N
S
LEGEND
LOW PRESSURE GAS GATHERING SYSTEM
HIGH PRESSURE GAS GATHERING SYSTEM
PRODUCTION LINES
LOW PRESSURE WELLS
INPUT WELLS
SCALE- 2 INS. = 1 MILE

Southern Section, Turner Valley Gas Field, Alberta, Canada.

TURNER VALLEY, in Alberta, is Canada's largest development source of natural gas and crude oil. In March of 1944 the Canadian Government, with the passing of the Natural Gas Utilities Act, took the first step towards eliminating wastage and extending the life of the field. In July, the companies operating in the field were ordered to construct facilities to effect conservation of the gas. G. M. Blackstock, chairman of the Alberta Gas Utilities Board, late in December reported that the necessary installations to collect all available gas in Turner Valley for either marketing or repressuring would be completed early this year.

The objectives of this conservation program are several:

1. Life and production of the Turner Valley field will be increased. It is expected that 1,000,000 additional barrels of oil will be recovered over a 10-year period.

2. A supply of inexpensive natural gas for domestic and industrial use will be assured for from 25 to 30 years at present rates of consumption.

3. A market for all gas producers in the area will be provided.

4. Of immediate interest, the production of aviation gasoline, ammonia, and other war materials will be increased.

from the company absorption plant from 150 lbs. pressure to 450 or 800 lbs. pressure, allowing the gas either to be transmitted through 10 miles of 8-in. line to a scrubbing plant operated by Madison or returning it to the underground formation;

(d) Installation and operation of the 10 miles of 8-in. gas residue line.

At the time of writing, the 8-in. pipeline had been completed; the high pressure gas line to the input wells had been installed; and the low pressure gas gathering system had been completed. Two 600-hp. compressor units were on the foundations at the low pressure compressor station, and all the compressor equipment was expected to arrive on location shortly.

Repressuring

According to J. A. McCutchin, Calgary, western production manager of British-American, an important feature of this installation will be the repressuring of the oil and gas producing horizon in the south end of the field.

Author of a major portion of the B-A plan, he says:

"Since gas pressure is the primary force which brings liquid petroleum to the well bores, it is believed that a material increase in ultimate oil production will result from the reinjection of gas not currently needed for the market. At the present time, there is approximately 6 MM cf per day of low pressure gas being produced and being burned at the well separators. The low pressure system will gather this gas, compress it, transmit it to the high pressure station, after which it will be reinjected into the producing formation, if it is not delivered to the gas company to be used as fuel.

"It is not known the exact number of barrels of oil that will be produced as a result of the repressuring; however, a reasonably conservative estimate would be that one million barrels additional oil will be recovered over a 10-year period as a result of returning high pressure gas to the producing horizon. The repressuring of the south end of the field will also result in valuable information being obtained regarding the efficiency of repressuring in the field as a whole."

The new gas system is expected to handle approximately 15 MM cf of residue gas per day. From this gas, 45 pound Reed vapor pressure absorption gasoline will be recovered and delivered to Calgary by pipeline. At Calgary, iso-butane will be recovered from the absorption gasoline in the new Alkylate Feed Stock plant erected under the auspices of the Allied War Supplies Corporation, which controls allocation of all aviation alkylate produced in Canada.

This alkylate feed stock will be delivered then to the alkylation plant recently constructed at the Imperial Oil Co.'s Calgary refinery, also erected under AWSC auspices, for the production of 100 octane aviation gasoline.

After the absorption gasoline has been recovered, about 7½ MM cf of gas will be pumped back into the wells for repressuring purposes, and the remainder delivered to Madison's scrubbing plant where impurities will be removed from the gas before it is delivered to a public utilities company to be formed for the sale of gas to consumers in many parts of Alberta. This market includes a new ammonia plant in Calgary, another AWSC project, which consumes approximately 7½ MM cf of gas daily.

According to B-A engineers, the conservation practice outlined for this project is the most efficient and economical means by which production in Turner Valley may be increased during this critical period without drilling additional wells.

Turner Valley is Canada's largest developed source of natural gas and crude oil, and completion of the project is expected to recover 25 billion cu. ft. of gas, yielding 860,000 barrels of 45-lb. vapor pressure absorption gasoline which might otherwise be lost.

Incidentally, it is interesting to note that the compressors operating the new system will be powered by natural gas which has not been utilized in the past.

NEW BOOKS AND PAMPHLETS

National Fire Codes for Flammable Liquids, Gases, Chemicals and Explosives, 1945: This 592-page volume, recently published by the National Fire Protection Assoc., assembles the many standards dealing with these hazards. Superseding the National Fire Codes for Flammable Liquids, Gases, Chemicals and Explosives for 1943, the new volume contains up-to-date information on new chemicals and solvents used in war industries, including information on their fire hazard properties and the best method of fire extinguishment. In addition, there are six new or revised codes.

This new volume is divided into nine parts: (1) Flammable Liquid Storage and Handling; (2) Oil and Gasoline Burning Equipment; (3) Liquified Petroleum Gases; (4) Utilization of Flammable Liquids; (5) Gases; (6) Refrigeration and Fumigation; (7) Explosive and Nitrocellulose Materials; (8) Tables of Properties—Hazardous Chemicals, Flammable Liquids; (9) Flash Point Tests.

The book contains many tables and drawings. Page size 6x9, bound in substantial red cloth covers. Price $3.00 per copy post-paid. National Fire Protection Association, 60 Batterymarch St., Boston, Mass.

Strengthening the Congress—a report of the National Planning Association, 800 21st St., N.W., Washington, D. C. The research was conducted and the report prepared by Robert Heller & Associates of Cleveland.

Get Set to Sell—a pamphlet by the National Association of Manufacturers, 14 W. 49th St., New York 20. A top management view of postwar distribution planning and organization.

Notes on Utilities-Postwar—a booklet of the Postwar Planning Committee, Commerce and Industry Association of New York, Inc., 233 Broadway, New York, by John C. Parker, vice president Consolidated Edison Co. of New York, Inc.

Incentives for Supervisors and Executives—reprint of an address by Albert Ramond, president, Albert Ramond and Associates, Inc., Chrysler Bldg., New York 17.

Tomorrow's Public Relations — A Blueprint for American Business—A talk delivered before the Business and Professional Men's Group of the University of Cincinnati, Mar. 10, 1944, by Edward L. Bernays, partner of Edward L. Bernays, Counsel on Public Relations, 9 Rockefeller Plaza, New York 20, N. Y. Copies are available.

HIGHLIGHTS

Winter Gas Crisis: OWU Feb. 21 ordered industrial plants in the Appalachian area that use gas and have standby facilities using residual fuel oil to use those facilities to capacity for the next month. Also ordered: An emergency diversion of 20,000,000 cu. ft. of natural gas into Ohio to alleviate the gas crisis resulting from the latest cold wave.

J. A. Krug, WPB chairman, stated last month that cooperative effort by utility companies, industrial consumers and the general public with OWU will be necessary throughout the remainder of the winter, if a collapse of natural gas service in the industrialized areas of the midwest is to be averted.

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API's committee on petroleum reserves Feb. 22nd stated that more than two billion barrels of new petroleum reserves were added to the nation's oil supply during 1944.

•

OPA has announced that from 100 to 200 applications are being received each week from people who want to enter the stove business. Applications to sell stoves have been received from many types of businesses other than hardware and furniture stores. These include: Filling stations, grocery, tire, feed, drug and liquor stores. Policy has been to authorize new stove establishments only where need for additional utilities appears to exist. Total number of registered dealers and distributors of rationed stoves is around 58,000, of which 1500 are distributors.

•

First hearing in the FPC's natural gas investigation is set for May 1st in Kansas City.

•

"Radio Runs the Postwar Home" is the title of an article in the March 1945 *Coronet* (p. 123). Already new cooking and baking techniques involving the use of radio heat have been developed by Radio Corporation of America and at the Armour Research Foundation in Chicago, which is under the direction of Dr. Harold Vagtborg, who most gas men will remember as the one-time head of the Institute of Gas Technology.

States the article—"How is radio cooking done in such short-time magic? Simply by shooting short waves through foods; their molecules, stirred up by the electrical inferno thus produced, react by generating blitz-swift internal heat."

•

Federal loans totaling $600,000,000 will be made available to rural electrification cooperatives during the next three years, under provision of a bill introduced in the house by W. R. Poage of Waco, Texas.

While Texas and the other large gas producing states are considering ways and means of retaining their natural gas resources, Consolidated Edison Co. of New York, is hopeful of bringing natural gas to that area through postwar extension of the "Big Inch" or other pipelines.

•

WPB has given United Gas Pipe Line Co. top priority for construction of a 24-in., 140-mile $7,000,000 gas line from Cathage field to the company's Sterlington compressor station near Monroe, La. Construction, including two river crossings, to start upon receipt of FPC approval is scheduled for completion Sept. 1.

•

WPB has requested Tennessee Gas and Transmission Co. to increase the capacity of its new Texas-West Virginia pipeline 30% by Nov. 1st. Capacity of the line would then be increased from 200,000,000 to 260,000,000 cu. ft. per day.

•

"Solutions of Texas' Gas and Industrialization Problems" is the title of a pamphlet published last month by the University of Texas at Austin. Dr. E. P. Schoch, director of Research on Natural Gas at the University is the principal contributor. For more detail and comment see pages 8 and 24.

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The newly formed Louisiana Natural Gas Conservation Committee will seek to set up a state program of gas field proration and ratable withdrawals.

•

Standard of California's exploratory well four miles north of Rio Vista, Calif., has discovered a new natural gas field. On a test, the well produced in excess of 14,000,000 cu. ft. daily—enough gas to supply average consumption of approximately 90,000 California homes.

•

American Light and Traction Co. on Feb. 26 applied to FPC for a certificate to construct and operate a 1085-mile, 26- and 22-in. gas line from Hugoton gas field near Guymon, Okla. to points near Detroit and Toledo. From Detroit the line will extend about 140 miles to the Austin gas storage field in Mecosta County, Mich. Daily capacity, 145,000,000 cu. ft. Cost, estimated at $51,500,000. Construction to start not later than May 1, to be completed, Dec. 31, 1945. For first five years line would supply (a) Ohio Fuel Gas Co. 125,000,000 cu. ft. daily; (b) Michigan Consolidated Gas Co. all requirements above amounts to be furnished by Panhandle Eastern under existing contracts. Expected rates, based on present costs, 22½¢ per Mcf.

CORROSION AND PROTECTION

Of Buried Metallic Structures

Compiled and Abstracted by GUY CORFIELD, Technical Editor, GAS

5. Cathodic Protection, Influence on Adjacent Structures

An Analysis of Certain Circuits

GORDON N. SCOTT, pipe line technologist, Industrial Engineering Co., Houston. Excerpts from a paper, "An Analysis of Certain Circuits in Cathodic Protection," presented before the Division of Production 23rd Annual Meeting, American Petroleum Institute.

A SERIOUS problem, which has developed recently through the increasing use of cathodic protection, is that which popularly is referred to as cathodic interference. Briefly, the problem is concerned with the unintended imposition of an electric current on a structure not a part of a primary cathodic-protection circuit.

The elimination of such a spurious current on a pipeline often involves a choice of methods. For example, it may be expedient to treat a portion of a pipeline where it crosses the one under cathodic protection. Bonding, the name applied to connecting electrically the offended structure to the one under cathodic protection, is often the more feasible plan. It is important that the characteristics of the circuits involved be known, so that how much current must be drawn from the bonded structure to free it of the damaging influence of the stray current imposed on it can be established positively.

A further method is to limit the distribution of the current within a specified area. To accomplish this end, insulating flanges often are employed to segment electrically the pipeline. The question thus arises as to the efficiency of the insulating flange; for, if the flange permits current to leak through it, damage may result to the flange or pipeline.

The exact solution of these problems is of great practical importance; because, if only partly solved, serious damage to underground structures may not be avoided, but merely delayed. At present there is no uniform approach to the problem. In fact, there is not even available a generally accepted positive criterion whereby the owner of the offended pipeline may be assured of the clearance from his structure of the stray currents.

Accordingly, the primary purpose of this paper is directed toward the solution of these and allied problems. However, the method of approach, while affording a possible means of greater understanding of the problem in its various ramifications, also opens an experimental field of wide applicability and, therefore, several illustrations of the application of the theory to other problems are given.

For example, the method is applicable to the measurement of the so-called pipe-to-soil potential by means of low-resistance meters, usually considered unsuited to the purpose. Furthermore, the reasoning may be directed to the troublesome problem of polarization. Also, the system often permits the use of simple and inexpensive meters in some measurements where otherwise a more complex and costly apparatus would be required.

PRELIMINARY CONSIDERATIONS

Before proceeding with the development of this theory and its applications to specific problems, the meaning of certain terms must be understood clearly.

The resistance of a structure in an electrolytically conducting environment, such as the soil, is subject to calculation in only a very few ideal cases. The equation for the resistance of a sphere in an infinite conducting environment may be derived readily. Similarly, the resistance of a cylindrical element, as a segment of a pipe line, may be expressed simply in the mathematical dress. When such simple structures are contained within a discontinuance environment, the computations become more complex, because the distribution of the current in the environment is affected by the boundary—and in these cases it is necessary to take into consideration an image of the structure, symmetrically disposed with respect to the interface of the conducting and nonconducting environments.

When the structure loses its simple form, as, for example, a buried pipeline; and, further, when the conductivity of the environment varies from point to point, as it does in the soil, the calculation of the resistance of the structure soon becomes beyond the useful reach of mathematics. Nevertheless, the total resistance of the structure with respect to remote earth may be measured readily.

Remote earth may be considered as that distance from the structure where, from a practical standpoint, the resistance of the structure becomes not measurably different as the separation between the structure and the point of reference largely increases.

The resistance of an underground pipeline may be measured also with respect to any neighboring point, X, or, in fact, to any structure in the environment where the distance, x, of the point or structure from the pipeline is such as to yield a measurable difference in the final calculation. Therefore, there may be defined a coupling factor alpha, a numerically equal to the ratio of the resistance of the structure with respect to the adjacent point X and the resistance of the structure with respect to remote earth. Thus a may range from 0, when the point of reference is on the structure itself, to 1, when the point of reference yields a value of resistance not measurably different, within the accuracy desired, from its resistance at greatly increased separation.

In a cathodic-protection circuit an anode usually is arranged with respect to the pipeline to be protected electrically, a distance which in the judgment of the designing engineer is such as to yield an economic distribution of current over the span of the pipeline which it is desired to protect

It requires no mathematics to point out that, if the anode were situated closely adjacent to a bare pipeline, the passage of current through the soil between the anode and the pipeline almost completely would occur locally. On the other hand, ignoring the resistance of the metal in the pipeline itself, if the anode were remote from the pipeline, the distribution of current on the pipeline would be such that the current density over the entire length of pipeline would be the same—a desirable condition impossible exactly to meet in practice. But the anode-cathode separation for a coated pipeline of conductance approaching zero is immaterial so far as current distribution is concerned. The resistance of the exceedingly well treated pipeline is thus a constant, irrespective of the point of reference, provided the point of reference is not close to the anode.

It is very simple to determine in the field the combined resistance of the anode, R_a, and of the pipeline or cathode, R_c—which combined resistance may include the resistances of the connections or the leads to the potential source. For example, if the potential source is a rectifier of ample capacity, then the output current and voltage of the rectifier measures directly the external circuit resistance.* It is also possible to measure the separate resistances of the anode, R_a^∞, and of the cathode, R_c^∞, with respect to some remote point. Accordingly, a mutual coupling factor, a_{ac}, may be defined as the ratio of the loop resistance (the combined resistance of the anode and cathode), R_a+R_c, to the sum of the separate resistances at infinite separation of the anode and of the cathode, $R_a^\infty+R_c^\infty$:

$$a_{ac} = \frac{R_a+R_c}{R_a^\infty+R_c^\infty}$$

Usually it is not possible to measure directly the anode resistance, R_a, and the cathode resistance, R_c, in such a way as to determine the contribution of each independently to the total resistance. However, as earlier defined, let:

$$a_a = \frac{R_a}{R_a^\infty} \text{ and } a_c = \frac{R_c}{R_c^\infty}$$

from which by substitution in the above equation:

$$a_{ac} = \frac{a_a+ma_c}{1+m}$$

Where:

$$m = \frac{R_c^\infty}{R_a^\infty}.$$

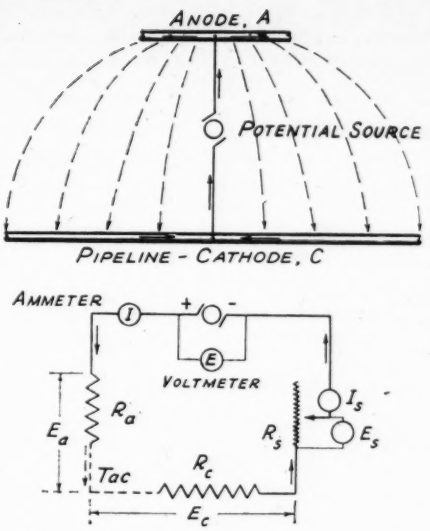


FIG. 1. The primary cathodic protection circuit.

As $m \doteq \dagger \infty$; i.e., if the pipeline coating has a high resistance, then $a_{ac} \doteq a_c$. Thus the mutual coupling resistance of the two structures is controlled by the cathode. The location of the anode with respect to the pipeline in this case is of secondary importance in the distribution of the current. On the other hand, in the cathodic protection of a bare pipeline the anode resistance may be high; hence as $m \doteq 0$, then $a_{ac} \doteq a_a$. Here the coupling resistance is controlled by the anode.

The foregoing deductions are more or less obvious, but in arguments to follow it will be convenient to rely by reference on the preceding more formal treatment rather than on verbal explanations.

In what follows, resistances which are specific, but usually not directly measurable, to the particular geometrical configuration of the several resistors in the electrolytic circuits will be encountered; i.e., for example, when mention is made of the resistance of a pipeline or of the resistance to an adjacent structure, what is meant, in fact, is the special resistance of the certain structure in its particular relation to some other reference structure.

THE PRIMARY CIRCUIT

In the several electrolytic circuits to be discussed, a given and fixed potential causes a current to flow through a set of electrolytic resistances, which usually are fixed in magnitude, and through a separate metallic resistance which may be varied at will. An important feature of these circuits is that a certain maximum current, called "the saturation current," will flow through the circuit when the variable resistance is shorted. The circuits are unique, in that the fixed resistances—comprising, for example, a coated pipeline in the soil and an anode—each have only one definite terminal to which can be affixed the leads to a meter. The indefinite terminal, as has been indicated in the previous discussion, as a practical matter cannot be found.

1. Simple Cathodic-Protection Circuit

The simplest form of the arrangement described is the conventional cathodic-protection circuit illustrated in Fig. 1, in the upper portion of which is shown a potential source delivering a current I at the voltage E, an anode A, and a pipeline, or cathode, C. The current paths are indicated by arrows, solid through the metallic portions of the circuit and broken through the electrolytic paths. In the lower portion of Fig. 1 is the equivalent electrical circuit. The broken lines again indicate the electrolytic portions of the circuit. The voltage drops across the anode and cathodes—which cannot be measured directly—appropriately are indicated by the use of an arbitrary location of the indefinite terminal *Tac*. Included in the circuit is a variable-series resistance R_s, through which the current I_s flows to cause the drop in potential, E_s. The resistance R_s, the current I_s, and the voltage E_s are all either known or can be measured.

The symbols which are used consistently throughout the paper to identify the resistance, voltage, or current values are given in Table 1.

From inspection of Fig. 1, we write down at once:

$$E = E_a+E_c+E_s$$

and differentiating with respect to I_s, the current through the variable resistance:

$$\frac{dE}{dI_s} = \frac{dE_a}{dI_s} + \frac{dE_c}{dI_s} + \frac{dE_s}{dI_s}$$

Maintaining E constant as R_s changes, noting that $I_s=I$, and that the differentials in E_a and in E_c are equal, respectively, to the constants R_a and R_c, we obtain:

$$-\frac{dE_s}{dI_s} = R_a+R_c$$

which on integration yields:

* It should be noted carefully that this combined resistance is a complex function unlike the "structure-point" resistance discussed in the previous paragraph, in that the measured resistance involves an integration of the resistance (conductance) between each element of the one structure and each element of the other structure. It is thus obvious that the measured resistance may depend as much or more upon the geometry of the setup as upon the resistivity of the soil.

† $\doteq$ means approaches.

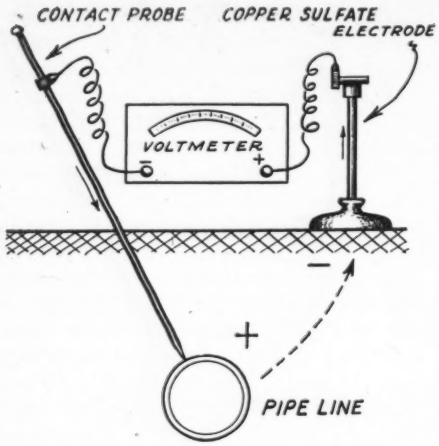


FIG. 2. The reduced-primary circuit.

$$-E_s = (R_a+R_c)I_s+C$$

when $R_s=\infty$, $I_s=0$; thus $-C=E_s°$ and, therefore:

$$E_s = E_s°-S_{II}I_s \quad \ldots\ldots\ldots (1)$$

Where:

$$S_{II} = R_a+R_c.$$

This is the *primary equation*. It is linear. When measured or calculated values of E_s are plotted as ordinates against the currents I_s through the series resistance R_s as abscissae, the slope of the curve is negative, and is equal numerically to R_a+R_c. The curve intercepts the ordinate axis at the *open-circuit potential* $E_s°$, where $I_s=0$, and intercepts the abscissa axis at the *saturation current* $I_s°$, where $E_s=0$. The saturation current $I_s°$ is determined at any source voltage by the *limiting resistances* R_a and R_c.

The negative slope, S_{II}, of the curve is equal to the quotient of the open-circuit potential and the saturation current; and, as this is true in all equations to be developed, a general equation for the slope is written thus:

$$S_N = \frac{E_s°}{I_s°} \quad \ldots\ldots\ldots (2)$$

2. Use of a Multi-range Voltmeter as a Potentiometer

It is not necessary that an external potential source be employed in certain measurements. For some purposes use may be made of the galvanic potential nearly always existing between any two electrodes in an electrolyte. This use may be illustrated by answering the important question so often raised as to how high must the resistance of a meter be to measure galvanic potentials. Meters having resistances in the order of one-half million ohms per volt or higher sometimes are used; but potentiometers which, on balance, draw no current are much preferred. But the use of low-resistance or current-drawing meters are also adaptable to the measurement of galvanic potentials.

Fig. 2 illustrates a copper-sulfate electrode as cathode, connected through a voltmeter to the pipeline as anode. This circuit is identical electrically to that depicted in the lower portion of Fig. 1, and the equation developed for that circuit, therefore, is strictly applicable in this case. There is, however, an important difference: The anode resistance may be an ohm or considerably less and is, therefore, entirely negligible with respect to the resistance of the copper-sulfate electrode which may be several hundred ohms. Accordingly, R_a in equation (1) may be taken as 0, and there is obtained the valuable *reduced-primary equation:*

$$E_s = E_s°-S_II_s \quad \ldots\ldots\ldots (3)$$

where: $S_I=R_c$, or sometimes R_a.

In making the measurements it is not necessary to use an external series of known resistances or to measure, for unknown resistances, associated values of voltage drops across the resistances and current, if a multi-range voltmeter is available for use as an ammeter. For example, the full-scale deflection of the needle of a voltmeter having a resistance of 1000 ohms per volt will occur with the passage through the meter of a current of the strength of 1 milliampere. If, for each current I_s read, the scale setting or meter resistance is noted, then the potential drop E_s is calculated readily. Or, referring to Fig. 3, rays representing resistances corresponding to the scales of the meter first may be drawn on a chart. The labeled radiating lines in Fig. 3 are for a multi-range voltmeter having a resistance of 1000 ohms per volt, and 10 scales from 20 millivolts to 20 volts. Then the chart having been prepared, it is necessary only to plot a current reading on the appropriate scale line, which tells at once the potential drop E_s through the meter. The readings on the one volt scale give directly the current through the circuit—which includes the meter, in fractions of a milliampere.

Through the plotted points a straight line is drawn, in accordance with equation (1) or (2), to intercept the coordinate axes. The intercept on the ordinate $E_s°$ gives the no-current or potentiometric reading, which in all cases in Fig. 3 checked exactly the values measured with a potentiometer. The intercept on the abscissa gives the saturation current, and the quotient of the two is the limiting resistance R_a, R_c, or R_a+R_c, as the case may be.

TABLE 1 SYMBOL REFERENCES.

Subscript	Reference
a	Anode
c	Cathode
l	Leakage
p	Polarization
s	Variable-series or shunt resistance
w	Lead wires or connections
None	Source
Superscript	
o	Initial or final values at coordinate intercepts
d	Particular values at fixed drainage; sometimes, for convenience, a subscript
Prime	Separation of secondary quantity from like primary quantity

Fig. 3 is useful also in illustrating the adaptability of a certain meter to a particular job or, more usefully to determine the equipment required to secure the data needed to answer a given question. For example, suppose it is desired to determine if there is an exchange in current between 2 adjacent submarine pipelines differing in potential by 0.2 or 0.3 volt. In the salt water, the resistances of the pipelines, even if fairly well coated, are certain to be low; hence, within the current range of a certain meter, the curve may be a horizontal line—or nearly so. Consequently, that meter would measure accurately the galvanic potential between the structures, irrespective of scale; but the saturation current $I_s°$, which would be very large, could not be determined with the meter without the use of a shunt, because the current capacity of the meter would be exceeded greatly.

Similarly, two small objects differing in potential may have such high resistances that the curve would be nearly parallel to the ordinate; and although it might be possible to determine the saturation current, $I_s°$, the open-circuit potential, $E_s°$, could not be found conveniently by extrapolation without the use of a meter of low-current capacity, such as a microammeter.

THE DRAINAGE CIRCUIT

A drainage circuit is one in which a *secondary structure* is appended metallically to the cathode of a conventional cathodic-protection installation comprising the *primary structures*. An example of an appended system would be one in which: 1, an isolated segment of a pipe line; or, 2, a tank isolated electrically by means of an insulating flange from the structure under cathodic protection; or, 3, another adjacent pipeline, is bonded

metallically to the structure under cathodic protection. Such a system is illustrated in the upper portion of Fig. 6, in which a remote section of a pipeline, set apart by an insulating flange, is connected through a bond or resistance, R_s, to the portion of the pipeline under cathodic protection.

The equivalent electrical circuit is shown in the lower portion of Fig. 4, in which the subscript x, according to Table 1, refers to the appended or drained structure. In this case the secondary structure, X, is shunted across the cathode C by the electrolytic circuit and the metallic bond.

1. Deviation of the Drainage Equation

Referring to Fig. 4, and proceeding as in the development of equation (1), we write:

$$E = E_a + E_c = E_a + E_x + E_s$$

Noting that:

$$E_a = R_a I, \text{ and differentiating}$$

$$\frac{dE}{dI_s} = R_a \frac{dI}{dI_s} + R_x + \frac{dE_s}{dI_s}$$

As:

$$I = I_c + I_s, \text{ and}$$

As:

$$I_c = \frac{E_x + E_s}{R_c}$$

$$\frac{dI}{dI_s} = \frac{1}{R_c}\left\{R_x + \left(\frac{dE_s}{dI_s}\right)\right\} + 1$$

from which, when E is held constant, we derive by substitution and integration:

$$E_s = E_s^\circ - S_{III} I_s \quad \ldots\ldots\ldots (4)$$

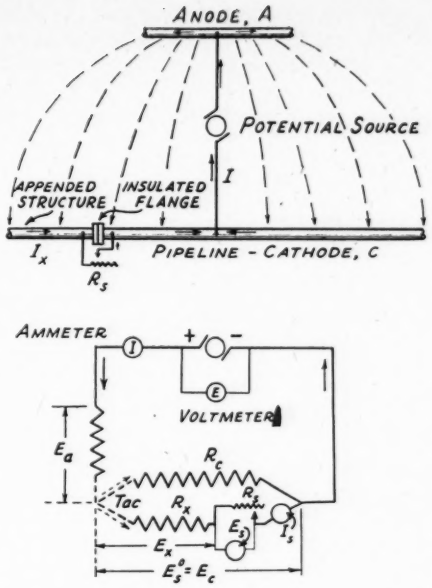


FIG. 4. The circuit for the appended structure.

Where:

$$S_{III} = R_x + \frac{R_a R_c}{R_a + R_c}$$

2. Complete Solution of the Drainage Equation

Equation (4) is like equations (1) and (3), is linear, and has a negative slope. Therefore, we may measure a series of associated values of E_s and I_s as before, and extrapolate the straight-line curve through the data to the coordinate axes.

When I_s is 0, the open-circuit potential E_s° is equal to the potential across E_c which carries the current I; hence:

$$R_c = \frac{E_s^\circ}{I} \quad \ldots\ldots\ldots (5)$$

Similarly:

$$R_a = \frac{E - E_s^\circ}{I} \quad \ldots\ldots\ldots (6)$$

The source current, I, is variable, because shunting the resistance R_x across the resistance R_c lowers the total loop resistance from:

$$R_a + R_c \text{ to } R_a + \frac{R_c R_x}{R_c + R_x}$$

Therefore, it is advisable and sometimes quite necessary to observe not only the initial source current, I, but also the final current, I', which may differ from I if R_c is high and R_x is low in resistance. The value of E_c' at the saturation current I_s° is the product of the final current I' less the saturation current and R_c. Therefore:

$$R_x = \frac{E_c'}{I_s^\circ} = \frac{(I' - I_s^\circ)R_c}{I_s^\circ} \quad \ldots\ldots\ldots (7)$$

It can be shown that both E_c and I vary linearly with I_s; hence two values of I only are required to determine for any value of I_s the corresponding values of I and of E_c.

It is stressed again that the three calculated resistances, R_a, R_c, and R_x, are referred to an indefinite electrolytic terminal in accordance with the preceding exposition under Sect. II. This terminal is as a sort of electrical center of gravity of the components of the circuit. The values calculated are, therefore, specific to the particular geometrical configuration of the circuit. The calculated resistances represent an electrical balance which controls the current and potential distributions.

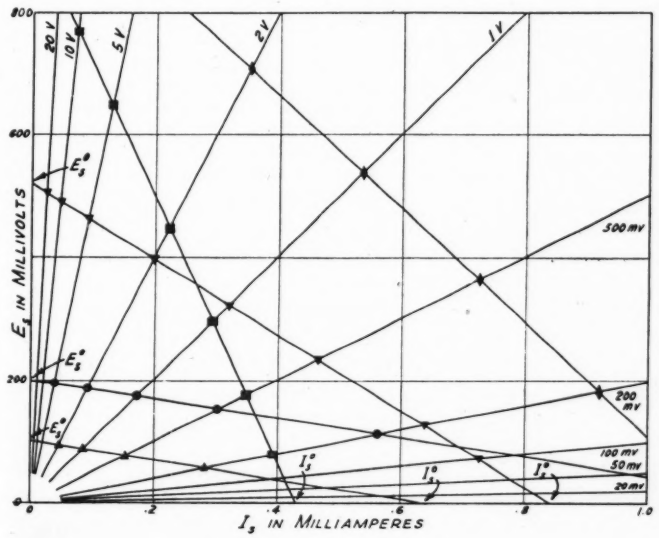


FIG. 3. Open-circuit potential measurements by means of a low-resistance, multi-range voltmeter.

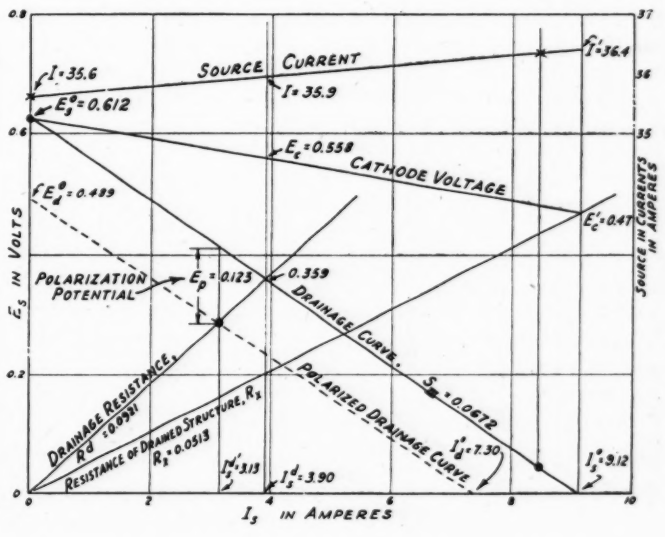


FIG. 5. Design of a drainage bond and the effect of polarization.

TABLE 2

E_s	I_s	I	E
0.612	0	35.6	7.31
0.043	8.46	36.3	7.31

3. Design of a Drainage Bond

The foregoing analysis may be clarified by carrying through with the steps in the design of a drainage bond in a practical case. The calculations, which will involve more work than really is needed in the design, will serve to show the large amount of information which may be derived from few data simply obtained.

Assume that a pipeline under cathodic protection is insulated from a fuel storage tank which it is desired to protect electrically with a minimum amount of current.

The problem is to design a drainage bond to deliver that particular current which is required to cause a drop of, say, 0.2 volt through the coating on the tank or, perhaps, that current which is of sufficient strength to polarize the tank bottom to a given degree.

The data required consist of at least two associated pairs of values of the voltage across and of the current through two values of a bond resistance. These two sets of data might well be the open-circuit potential (infinite shunt resistance) across the insulating flange and the saturation current (zero shunt resistance). However, if polarization is apparent, intermediate values are preferable. The source voltage and the initial and final source currents also are needed in the calculations.

In this case, inasmuch as the insulating flange was readily accessible, the open-circuit potential ($E_s°$, $I_s = 0$) and the saturation current ($I_s°$, $E_s = 0$) were measured. However, the ammeter used to measure the saturation current had an appreciable resistance; and, as $E_s°$ is small in magnitude, the voltage drop through the meter was taken into account. The data secured are given in Table 2.

The data of Table 2 are plotted in Fig. 5. Both the drainage curve and the source-current curve, drawn through the experimental points, are extrapolated to obtain the saturation current of 9.12 amperes and the corresponding final source current of 36.4 amperes.

From the data and from equations (5) and (6):

$$R_c = \frac{0.612}{35.6} = 0.0172 \text{ ohms}$$

$$R_a = \frac{7.31 - 0.612}{35.6} = 0.188 \text{ ohms}$$

At the saturation current, $I_s°$, the voltage drop E_c' through the cathode is 0.0172 times the final source current of 36.4 amperes found from Fig. 5 less the saturation current of 9.12 amperes, or 0.469 volt. This value is plotted in Fig. 5, and a straight line is drawn to show the relationship between E_c and I_s. This is the *cathode-voltage curve*. Note that the ray drawn through E_c' is R_x.

From equation (7):

$$R_x = \frac{0.469}{9.12} = 0.0513 \text{ ohms}$$

This value of R_x may be checked by calculating the drainage-curve slope:

$$S_{III} = \frac{0.612}{9.12} = 0.0672 \text{ ohms}$$

and subtracting from it the resistance value (0.0158 ohms) of the parallel circuit in R_a and R_c in equation (4).

Hence, in order that the potential of the tank be lowered by 0.2 volt, it will be necessary to drain a current of:

$$I_s^d = \frac{0.2}{0.0513} = 3.90 \text{ amperes}$$

At this drainage current an ordinate is erected in Fig. 5 to intersect the drainage curve, the cathode-voltage curve, and the source-current curve. From one of the several intersections we find that, at this drainage current, the total source current is 35.9 amperes. Hence, on drainage, the cathode current is 32.0 amperes, instead of 35.6 amperes without drainage. The cathode is at a potential 0.558 volt instead of at the original value of 0.612 volt. The drop across the drainage resistance is 0.359 volt, which is also the potential difference between the cathode and the drained structure. The drainage resistance, given by the intersecting ray, is:

$$\frac{E_s}{I_s} = \frac{0.359}{3.9} = 0.0921 \text{ ohms}$$

To complete the picture we might have included a straight-line curve to show the change in anode voltage with the shunt current I_s, but this curve is of little practical value.

Dallas Utility Rates Down

Dallas utility rates have been reduced a total of $9,567,474 since May 1, 1939, and the city has obtained $903,575 through an increase in direct taxes paid by the companies in the same period. Lone Star Gas Co. rates were reduced in 1942 and patrons have saved $1,927,843 while the city has obtained $192,756 through a 2 per cent gross receipts tax.

PIPELINE NEWS

• To prevent "serious and prolonged interruption of war production next winter," WPB has requested Tennessee Gas and Transmission Co. to increase the capacity of its 1265-mile Texas-West Virginia gas line 30% by Nov. 1.

In compliance with WPB's request the line's capacity will be increased from 200,000,000 to 260,000,000 cu. ft. through the construction of four compressor stations. Gas will be obtained from other than Stratton-Agua Dulce field, the present source of the line's supply.

Defense plant corporation facilities will be available for financing.

• F. P. C. has ordered a hearing March 14 on the application of The Kansas Power and Light Co., Topeka, Kan., for a certificate of public convenience and necessity to construct and operate 25.8 miles of gas pipeline and a gasoline recovery and dehydration plant.

Kansas Power and Light proposes to build the following: 18.5 miles of 16-in. line in Barber County, Kan., to connect with the applicant's existing 18-in. line in Pratt County, Kan.; 20,500 ft. of 8-in. line in Barber County to connect with the proposed 16-in. line and extend to the east. 4500 ft. of 8-in. line in Barber County to connect with the proposed 16-in. line and extend to the west. 14,000 ft. of 4-in. line to connect wells in Barber County.

A gasoline recovery and dehydration plant will also be constructed.

The facilities are to be used for transportation of natural gas from the Lake gas field in northeast Barber County to the Company's pipeline system at a point south of Pratt, Kan.

The Kansas utility asserts that the proposed facilities will make available 60,000 Mcf of natural gas per day after the second year of operation,

• W. C. Norman, secretary-treasurer of the **Tennessee Gas & Transmission Co.**, Houston, announced that the withdrawal of its application to the Federal Power Commission for authority to build and operate 65 miles of additional pipeline in Texas was temporary, and the company still plans to build the the line. The hearing called for Feb. 8, was canceled, but Norman said it was "just too early and we hadn't time to present our case." He said the 65 miles of line will comprise a series of side connections to 10 or 12 gas fields along the path of the main pipeline across Texas, from which the company expects to gather casinghead and waste gas now being flared.

• **Lone Star Gas Co.**, Dallas, has started clearing right-of-way and laying a 90-mile gas pipeline from the Carthage field in Panola County to its plant at Trinidad, Henderson County, giving the Panola Trinity series wet gas pool a new outlet. Lone Star has contracted with Rogers Lacy, Longview, for the gas. Lacy plans to move a recycling plant into the field possibly within a month. He owns a plant in the Willow Springs gas area near Kilgore, Gregg County, and will dismantle it and move it to a site acquired nine miles north of Carthage.

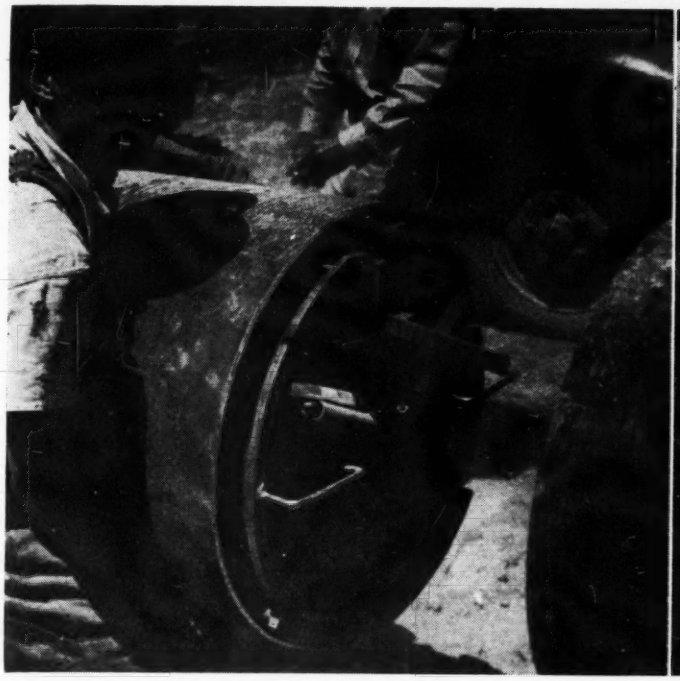


FIG. 1 (left). Clamp set in one joint with holding jack expanded to keep clamp in position while inserting in other joint. FIG. 2 (right). Pumping hydraulic pressure to expand clamp in joint.

Inside Line-up Clamp for Pipeline Construction

THE Price-Elliott inside line up clamp was developed, used and, according to the manufacturer, proved successful in the construction of the Tennessee Gas and Transmission Co.'s 26-in. line, which was completed last November.

Results obtained have shown the following:

1. Speed-up of laying and production of approximately 25% over the old method, using the outside line up clamp. With this clamp, line up and first bead can be completed in 4 minutes. Using the outside clamp, according to data received, the operation took a minimum of 7 minutes and often as long as 20 or 30 minutes, depending upon the condition of the pipe, to make the line up, tack and weld.

2. The new clamp makes possible a saving in steel. Construction of large diameter natural gas lines during the past 18 months have had a wall thickness not greater than 9/32 of an inch. Much of the pipe has been ¼-in. wall thickness. With this thin-wall pipe it has been difficult to retain the circular shape of the pipe ends through delivery to and stringing along the right of way. In many cases this thin wall pipe is egg shaped when received in the railhead. In unloading and stringing, such pipe must be handled carefully to prevent indentation of the ends. This distortion and damage to the ends has made it extremely difficult to line up the pipe for welding by the old method. In the past it has been the practice to cut off bad ends as far back as necessary. The Price-Elliott inside clamp eliminates this waste of time and material since it expands by hydraulic pressure, thus forcing the pipe ends back to their original shape.

The clamp is operated in the following manner:

1. A single pump operates two hydraulic jacks, the small jack being raised to hold the clamp in place while inserting it in the other joint.

2. After the two pipe sections are placed together, the large jack is then raised to expand the three segments into a perfect circle which holds the pipe in correct alignment for welding.

The clamp is made in three segments and, when hydraulically expanded, forms a perfect circle against the inside wall of the pipe. This results in a smooth joint inside the pipe. If there are any offsets because of variation in wall thickness of the two joints of pipe, the offsets are on the outside.

The outside clamp does not bear continuously on all surfaces of the joint since openings must be left in order that welders can make the tack weld. Results were that thin-walled pipe often buckled between the bearing surface, and these buckles had to be wedged and hammered to make a smooth joint, taking considerable time and delaying welding and laying operations. By using the inside clamp, there is no obstruction on the outside of the joint—thus the welders are able to make a complete first bead without first having to make a multiple number of tacks.

The new clamp was designed by B. V. Elliott, equipment superintendent of H. C. Price Co., and is being manufactured by that company at their Bartlesville warehouse. Patent has been applied for.

FIG. 3. Welding stringer bead on pipe with clamp expanded inside of pipe.

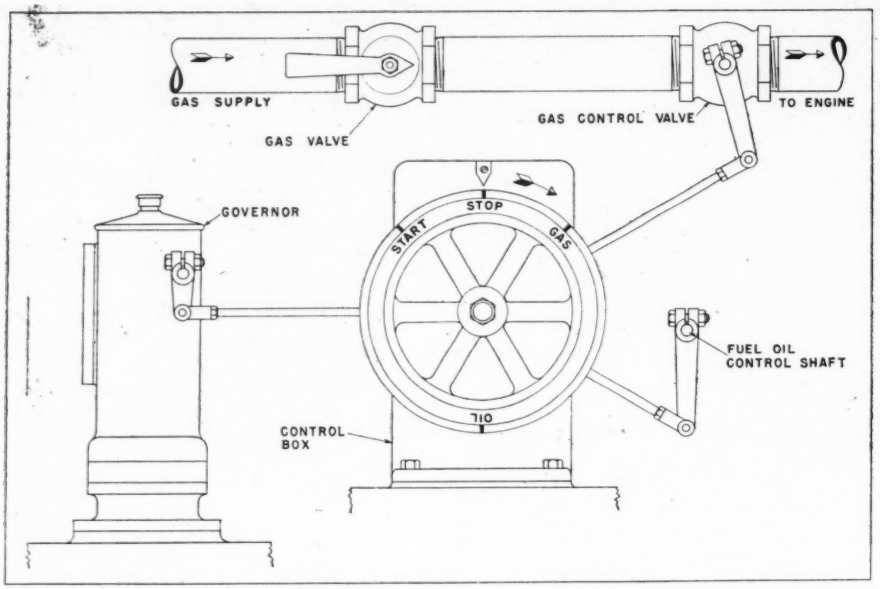


FIG. 1.

New Gas-Oil Engine Developed

By RALPH L. BOYER

Chief Engineer, Cooper-Bessemer Corp.

New Gas Engine Design Cuts Fuel Consumption 25 Percent

A NEW development in the Diesel engine field, which will enable the engine operator to use either gas or oil as fuel without any electrical sparking device, and which will cut fuel consumption of gas engines by from 20 to 25%, has been revealed by The Cooper-Bessemer Corp., Mount Vernon, Ohio and Grove City, Pa. When the engine is operating on gas, a small amount of "pilot" oil is admitted to maintain ignition.

This development is the result of experimentation which began in 1927. Recently efforts have been rewarded by the successful operation of a natural gas engine on the Diesel principle. This enables the unit to operate on a wide variety of fuels including fuel oil, natural gas, manufactured and coke oven gases, sewage gas, and refinery by-products.

The conversion from liquid to gas fuel is as simple as the closing of one valve and the opening of another with the engine operating continuously at full load. Although conversion from one fuel to another has been possible in the past, it has always been necessary to shut down and exchange major or minor parts of the engine.

Cooper-Bessemer already has engines embodying the new principle in production along with their standard line of marine and stationary engines and standard compressor units.

The development leading up to the burning of gas on the Diesel cycle can best be explained by comparing it with the normal spark-ignited engine operating on what is known as the Otto cycle. The usual 4-cycle gas engine operates on the same general principle as the better known 4-cycle gasoline engine. A mixture of gas and air is made on the intake, the ratio of gas and air being held constant. The quantity of the mixture is varied in accordance with the load demand by throttling the intake.

At full load, therefore, the intake manifold is under only a slight vacuum, while at no load it is under a high vacuum. The compression pressure depends upon the load and at full load ranges from about 90 lbs. to about 125 lbs. per sq. in., depending upon the quality of gas.

Ignition is always by means of spark. Two-cycle gaseous fuel engines operate on the same principle, except that inasmuch as the cylinder is scavenged with air the gas is not put into the cylinder until after the ports are closed. Therefore, on the 2-cycle engine the air quantity is constant, while the gas is varied, producing a mixture which is not of constant quality as is evidenced by the fact that the 2-cycle engine usually misses a great deal on the lighter loads.

The thermal efficiency of an internal combustion engine is a function of its compression pressure. For example, a 125 lb. compression engine usually results in about 10,000 Btu.'s per brake horsepower hour, while a 400 lb. compression engine usually produces a brake horsepower hour for about 7500 Btu's. It is, therefore, always desirable to keep the compression as high as possible.

On the Otto cycle engine the compression is limited because of premature ignition and must be held to the point where there is no danger of the mixture being ignited before the proper time. Therefore, the Otto cycle is limited to about 10,000 Btu's. per brake horsepower hour, or an efficiency of about 25%.

In 1927 we had the idea of burning gas on the Diesel cycle. A single cylinder test engine was built and operated on this cycle in 1928. Since it was not possible to go much beyond 125 lbs. compression with the regular line of gas engine, it was assumed that there was no chance of compressing the mixture to 400 lbs. for the Diesel cycle. It was arranged, therefore, to compress air only and then inject the gas on top dead center under very high pressure. The gas pressure actually used was about 1000 psi. It was found that while it was possible to run such an engine without any other ignition means, that the engine performed very much better if pilot oil injection was also used. The design of this engine and its performance are all a matter of record.

When the possibility of supplying a high pressure injection compressor was considered, together with the regular Diesel fuel oil injection means, it was decided that the design would not appeal commercially and, at least for the time being, should not be produced. Since that time at least one other engine builder has taken up this development and has proceeded to build a number of large engines and install them in the field. The Cooper-Bessemer Corp. was not particularly interested in building the engine, if it had to supply it with high pressure injection.

As stated above, no thought was given at that time to the possibility of allowing the gas to go in with the intake air, because of the assumption that it would pre-ignite. Actually it is a bit dificult to get gas to ignite at 400 lbs. compression, even if in a perfect mixture ratio, although one cannot be sure it won't ignite.

Undoubtedly one reason for the Ot-

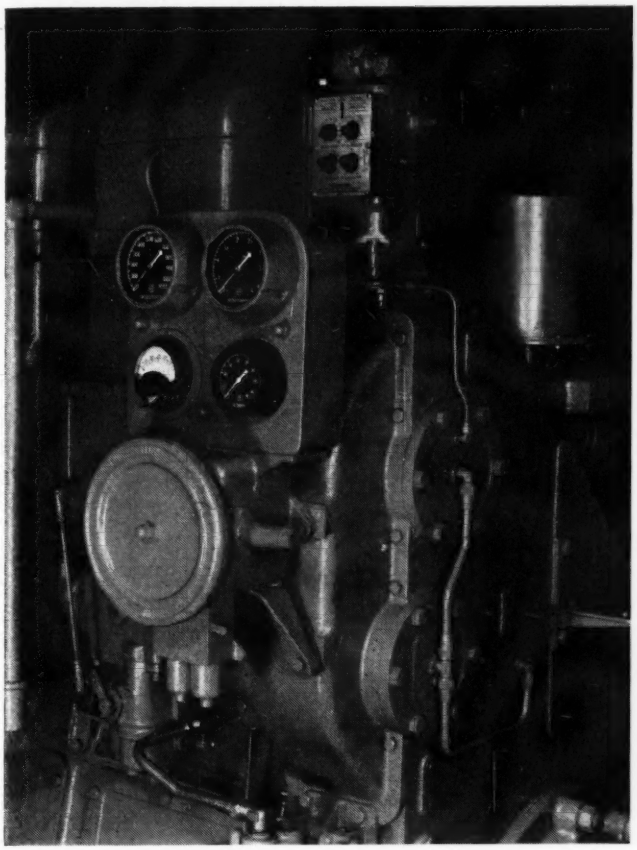


FIG. 2.

to cycle engine being limited so low in compression is the existence of hot spots in the combustion chamber. Theoretically, at least, the temperature of ignition of a perfect mixture of natural gas and air is above the temperature reached with 400 lb. compression. There is of course a minimum gas air ratio below which the mixture is not inflammable under atmospheric conditions, even when ignited with a spark, and also a maximum beyond which it will not ignite. The point that was not considered on the earliest work on burning gas on the Diesel cycle was that due to the inherent efficiency of that cycle the amount of gas required is considerably less than with the Otto cycle and the gas air ratio at full load is still a very lean mixture, not too easily ignited.

It was, therefore, found possible to admit the gas with the engine air intake and still be completely free of any evidence of premature ignition. In fact, on very heavy overloads with natural gas, the mixture will not fire without the pilot oil flame. It is of course possible to employ electrical ignition with this high compression, but electrical ignition under these conditions is not too reliable and the engine really requires a more positive flame anyway than can be provided electrically. Still further, the desirability of having an engine which can operate on either oil or gas makes the pilot oil ignition attractive.

It is obvious from the above that any engine built as a Diesel can be fitted to operate on gas, but of course engines built purely as spark-ignited gas engines cannot be converted to this principle. Assuming a Diesel oil engine in operation and on load, if gas admitted in the intake air the governor obviously will immediately reduce the amount of oil to compensate for the percentage being carried by the gas. It then merely becomes necessary to reduce the fuel oil injection to the desired minimum and then govern the percentage of gas according to load. It is clear that to convert the oil engine to the gas engine it is, therefore, merely necessary to remove the fuel oil system from the governor, set it in the minimum position and connect the governor to the gas regulating valve. This is an extremely simple move and requires not more than a few minutes.

In the normal case, a shutdown of a few minutes to make this conversion would not be of any consequence. There are cases where the gas availability varies frequently, as for example, in sewage disposal plants. There it is desired to be able to instantly change from oil to gas, or vice versa, or even to maintain a mixture of the two where there is insufficient gas to pull the load. To do this obviously requires some form of controls so that the operator can at will change from one fuel to the other, or even arrange it so that the engine automatically goes from one to the other as the gas availability fluctuates. Such controls are illustrated diagrammatically in Fig. 1, and in the photograph, Fig. 2.

There are hundreds of installations of Diesel engines, or of gas engines, which have been installed as convertible units, because of the uncertainty of the future of the particular fuel they are using. This is particularly true, of course, when installing an engine in a gas field of questionable future. The usual means of convertibility are by change of pistons, or of cylinder heads, or by means of spacers under the cylinder heads which will increase compression space when converting to gas. The conversion then consists of changing from an electrical ignition system to a fuel oil system or vice versa. The change obviously requires considerable time and involves expensive parts.

Since, in order to make such an engine convertible, it must be designed as a Diesel engine anyway, and it is therefore capable of withstanding the pressures of the Diesel cycle, it is obvious that the burning of gas on the Diesel cycle not only conserves gas, but also provides a very much simplified conversion. Still further, it provides a re-conversion to the original fuel at any time. The value of this latter is apparent when considering pipe line compressor engines for example, since it would be highly advantageous to convert to oil in critical times of gas shortage such as we have experienced quite recently.

Texas Producers Approve Repressuring Plan

Operators and owners of wells in the Pampa Pool, Gray County, Texas, have approved plans for re-pressuring the area with natural gas. Engineering estimates place the total recovery at approximately 52,000,000 barrels of additional oil if gas re-pressuring methods are used.

The pool, which lies between the town of Pampa and the western Gray county line, embraces approximately 11,500 acres, has 950 producing wells and runs about 15,000 barrels of oil daily.

Participating in the project are 26 operators, including 12 major companies. According to the agreement, Skelly Oil Co., one of the five operators of gasoline absorption plants in the field, will furnish the re-pressuring service and the other plants will deliver to Skelly the excess available residue gas for input purposes.

This is a sour gas area of the Amarillo field. The gas will be treated to remove hydrogen sulphide before it is injected into the oil horizon. Operators plan to start the program with injection of about 7,000,000 cu. ft., of gas per day. J. B. Steele, superintendent of the Kewanee Oil Co., Tulsa, Okla., is chairman of the temporary executive committee of the association.

New Office for Lone Star

L. B. Denning, Jr., operating manager for the Lone Star general division of distribution, has announced that a subdistrict office was established Feb. 1, at Purcell, Okla. E. L. Edwards, formerly subdistrict manager at Rockwall, has been appointed subdistrict manager at Purcell.

THE BOILING POT

HOME SERVICE

Speaking of reconversion—what about the job of converting returning GI's from K rations to home cooking.

The American Dietetic Association is taking up this matter in a serious way by warning wives that they must be prepared to set before their returning husbands good food, well cooked. These wives, experienced only in meat loaves, odd salads, chiffon pies, and attractively labelled tins, are urged to take a course in nutrition (or cooking) which will enable them to meet this test competently.

Public Service Electric and Gas Co. of New Jersey has responded by establishing a new home cookery course for war brides, according to Henry Steinmetz, vice president in charge of sales.

Cooking school for girl scouts brings together handicapped and normal children.

Mrs. Alta Weymuller, for 14 years supervisor of the Home Service Department of the Omaha Metropolitan Utilities District Girl Scouts Cooking School, has been conducting a five weeks course in cooking for Troop 53 and Troop 60 of the Scouts.

Troop 53, the girls wearing uniforms, as shown in the photograph, is of exceptional interest as the girls are all students of the Nebraska School for the Deaf, a state institution. Every one of the girls in Troop 53 have partially overcome the handicap of loss of speech and hearing.

Omaha Troop 60 are normal girls in every respect. The troops both worked around the same tables and got a lot of enjoyment out of each others company.

Mrs. Weymuller instructed the group entirely by lip reading, while Miss Emma Marshall, the troop leader. interpreted by the sign manual for the few girls who were not sufficiently advanced in lip reading.

The Girl Scouts receive a diploma at the end of the course, which entitles them to a Girl Scout Cook Badge.

The Scouts are permitted to invite their mothers to a graduating breakfast, which the graduating class prepare and serve. The course is given by the Utilities to all Girl Scout troops sent to the Home Service Department by the Girl Scout field secretary. The lessons are free of charge and all the material is furnished by the Utilities.

Graduating exercises of The Omaha Metropolitan Utilities District Girl Scout Cooking School brought together members of Troop 53, wearing uniforms, which is comprised of girls who have partially overcome the handicap of loss of speech and hearing, and of Troop 60, composed of normal girls. The picture was taken in the recently completed bungalow of Metropolitan Utilities, which is capable of seating 150 people.

SERVICE MEN

Two-way questionaire sent to Service men and their former supervisors will be useful in determining postwar re-employment.

Houston Natural Gas System and the Cincinnati Gas & Electric Co., have taken definite steps in planning the re-employment of their servicemen, after the war.

Houston Natural sent out a questionnaire and letter to each of its servicemen signed by Frank C. Smith, president of the company. The questionnaire included such questions as these:

1. Is it your present intention to return to Houston Natural Gas after the war?
2. Would you like to return to the specific position which you were filling at the time you entered the service?
3. In your previous work experience with the company, what job did you like best?
4. Do you feel that any specialized training which you have received in the service has qualified you for a different job in our company from the one you held previously?
5. If you had complete choice in the matter, with what department in the company would you most prefer to be associated?
6. Have you suffered any physical or health handicaps since entering the service?

Space was also made available so that the serviceman might, at his option, describe briefly any personal reactions with reference to returning to the employ of the company.

To date, more than 70% of the questionnaires have been returned by the servicemen and 97% of the replies indicate that the serviceman is looking forward to returning to his former employment with Houston Natural.

Questioning the serviceman about his desire to return to the company was not a one-way proposition, as a two-page questionnaire was also sent to his former immediate superior in the company. The questions asked the latter were designed to provide a frank evaluation of the returning veteran, as well as bring forth unprejudiced opinions and recommendations concerning his future career in the company.

The information contained in the reports from the servicemen is being correlated with that set forth in the questionnaires returned by the supervisors. The completion of this task should provide a sound basis for placement of Houston Natural's returning servicemen to positions where their talents, education, experience and training will be of most value to the company and offer the greatest opportunity for accomplishment and advancement to the individual.

Anyone in the company is free to see and talk to any executive when he wants to. Shell welcomes ideas and suggestions from employees, and gives recognition to those whose ideas are helpful.

PUBLIC RELATIONS

Shell Oil Co. acquaints its thousands of employees with the increasing importance of good "public relations."

The campaign started with a booklet, "We Call It Public Relations" with a front cover explanation, "actually its the things we do or say that make the people like and understand us." The booklet is illustrated with sly, humorous black and white drawings and tells in clear primer-style English the story of Joe Doakes and Joe Shell—how one received and the other avoided a "black eye" from the public. A page is reproduced above.

Shell sends the booklet to every employee but doesn't drop the matter there. In small discussion groups, Shell employees go over the text which has been enlarged for easel presentation.

The book does not advise dogmatically, but merely suggests some solutions to the age old problem of getting along in the world. In conclusion the book states:

"If every member of the Shell family will make just a few good friends, will do his bit to endear himself to the people he meets, will have a good word for his associates and his company, an amazing thing will happen. Before a year rolls around, you'll find the Shell family has thousands of new friends and supporters. And a good, strong, well-liked company is a mighty fine guarantee of a good, steady job."

The booklet should be of interest to anyone in business, for it shows how a highly complicated topic can be tackled in a concise, thorough manner worthy of the best institutional advertising—and yet doing it with simplicity, warmth, humor, and understanding. For copies write Public Relations Department, Shell Oil Co., Inc., 50 West 50th St., New York 20.

WATER HEATERS

What's in a name?

What do you call a water heater? A *hot* water heater? An automatic *hot* water heater? One of our friends and informants tells us that there are too many phraseologies used to describe a hot water—oops a water heater, all of which create the wrong impression. He states that a hot water heater is used to generate steam and not to heat water, which may or may not already be hot. He thinks the people in the industry should get together and call a water heater a *water heater*.

PROMOTION

The Liquefied Petroleum Gas Industry hears about the Gas Industry's new promotion program.

E. Carl Sorby is vice president of Geo. D. Roper Corp. He is also chairman of the publicity committee of the Liquefied Petroleum Gas Association. In that latter capacity on Feb. 13, he sent a letter to all L.P.G.A. members calling their attention to (by quoting the entire comment) an editorial, "Publicity," by Stanley Jenks, which appeared on Page 47 of the January GAS. The gas and liquefied petroleum gas industries have many common problems, two of which are electrical competition and a lack of knack at obtaining favorable publicity.

COMMON COLDS

They are responsible for more lost time in industry than all other factors combined. Here is one answer to the problem.

A partial answer to absenteeism from this cause might lie in a relatively new product, Formula A-N-1 for colds. Samples are supplied free so that industrial concerns may make their own tests, in their own plants, under their own supervision. Several public service companies, including Atlanta Gas Light, Boston Consolidated Gas, Lone Star, Natural Gas Pipeline of America, Ohio Public Service, and others are using the product, according to the manufacturer.

The product, a pleasant-tasting effervescent powder which contains only citric and some of the more important mineral elements of vegetables and fruits, is made available to employees of these plants through plant hospitals, first-aid stations, safety directors, etc. Results as reported by users indicate that it is effective in the average in about 80% of the cases, with four doses required per cold. This means that on the average it costs about 35¢ to keep an employee on the job.

Interested industrial organizations are invited to write to Benson Laboratories, Bessemer Building, Pittsburgh, Pa. for enough Formula A-N-1 to make their own tests.

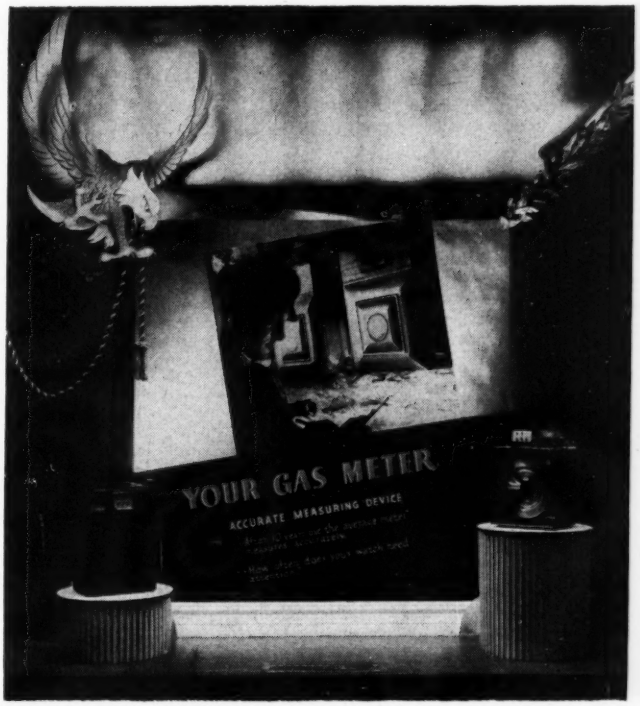
MICHIGAN CONSOLIDATED GAS CO. WINDOW DISPLAY

Dramatization of Accuracy of Gas Metering Proves Effective in Public Relations

Michigan Consolidated Gas Co., Detroit, recently developed two effective window displays, dramatizing the accuracy of modern gas metering — one of which is shown.

The meters displayed are American Meter Co. instruments, and the photograph is an enlargement of an illustration reproduced in that company's Tinned Steelcase Meter Catalog.

At the right of the photograph is a meter with a glass case for demonstration of meter operation. A small motor behind the screen operates the meter. This was fitted up in Michigan Consolidated's own shop for use primarily in their Commercial Training Department.



POSTWAR NOTES and NOTIONS

By STANLEY JENKS

At Last

This page, since its inception, has been consistently devoted to the cause of postwar mental sobriety. It has squirmed with embarrassment at our own A.G.A.'s advertising venture into the nebulous, and it has never hesitated to ridicule to the limit the postwar self-hypnotism practiced by the more ebullient brethren of the advertising profession. You remember, we call them the *Plastonic* lads. The miracles that were going to be worked with plastics and electronics, once Hitler and Hirohito were effectively ploughed under, were eye-popping, to say the least.

And now we—red-faced as a gone gobbler's jowl—are thoroughly refuted. Idly gazing through the window of a New York-bound train recently as we chugged through the icebound suburbs of a northern New Jersey city, we saw it with our own eyes. Yes, sir! A large canvas sign stretched across the second floor of a rather shabby two-story building read "Electronic Plastics Company."

I'll never scoff at crystal-gazing again.

Coordinated Kitchen Campaign

Far be it from me to seem contrary, but who sells what in this A.G.A. coordinated kitchen campaign, which is taking up so much of our official promotional activity (and dough) at the present time?

The basic idea is to sell gas, and to do this it seems as though we need to coordinate our gas ranges and refrigerators dimentionally to meet the specifications of the kitchen cabinet, furniture and fixture people so that a neatly designed, complete kitchen can be sold as a unit to the little woman, who is presumed to be either too busy or too dumb to have her own ideas on the subject.

If this is the best way to prove the superiority of gas as a domestic fuel service in the considered judgment of our best promotional brains, then there is little more to be said. But to me, probably discouraged by prolonged efforts in the past to see even a glimmer of a willingness to standardize among utility utilization men, it appears to be a rather nebulous undertaking. Almost on a par with a fruit-bottling company going in for Manhattan cocktail mixing to sell cherries.

I feel it is a range manufacturer's basic job to design and sell a range that will fit any reasonable and anticipatable kitchen combination. It is the gas company's job to carry the ball from then on, and make it its particular business to see that this gas range and all as good as it, are placed in every possible kitchen along the mains.

All else is fancy Dan stuff, and likely to be mighty confusing too.

Cooperation

While there is nothing new in the recently released recommendations of the A.G.A. Executive Board covering cooperative promotional plans, the recommendations are very much to the point and ought to be pasted in every gas utility promotional man's hat. In the past, similar recommendations from humbler sources have been received with gusto and filed away with relief. They were disturbingly annoying to the lad whose management rated his ability as a sales executive solely by the number of appliances sold by the merchandising department.

For example, take Recommendation No. 4 of the present document, which reads "That the gas utility should assume responsibility for gas appliance sales training of personnel (utility *and dealer alike*), utilizing the cooperation of gas appliance manufacturers."

This implies, of course, that gas utility salesmen will be load-building respresentatives, paid to help, and not take away, standard appliance sales from such dealers, representing manufacturers whose products are not necessarily retailed by the gas utility. Right there, my friends, we'll find out whether Recommendation No. 4 is merely the icing or the cake itself.

"Dream Houses" Out

The way the National Association of Home Builders see things, if their Chicago convention in January meant what it seemed to say, the American postwar new home will be anything but the "plastonic" phantasy of our anemological ad writers. The postwar home will be undoubtedly better, and will reflect many war-created innovations, most of them, however, of little more than gadget-significance. Solid comfort and affordable convenience will still be the good old mainstay of our American postwar home.

In the first place, we are told the average postwar home will cost about 30% more than its prewar equivalent. This increase, to a great extent, reflects projected improvements, such as heavier insulation, automatic heating, and complete kitchen units, including built-in dish washers and garbage disposal units.

Air-conditioning at first will be beyond the little fellow's purse. P. B. Zimmerman, president of the Indoor Climate Association, the national central air-conditioning group, stated that all-year-round air-conditioning will be used far more generally, but not in homes costing less than $6000. Gas service ought to be very much in the air-conditioning picture. Heaters will be more automatic. The builders and architects both keenly appreciate the public antipathy to handling and shoveling coal, and getting messed up with ashes. Curiously enough, builders and architects at Chicago are counting on oil burners and improved coal stokers to turn that trick for them. Where do they get that stuff? How do they get that way? The answer is obviously local gas service promotional apathy for the most part, for the status of the entire American gas industry in any territory is the sole responsibility of the gas company serving that territory. I am wondering if, in our anxiety to sell kitchen cabinets, neatly matched garbage pails, and harmoniously patterned linoleum floor coverings, we are perhaps overlooking the major promotional job of selling a better fuel service.

Gay White

General Manager, Radio City Distributing Co. Dallas, Texas

Tells Why Coleman Dealers Become The Leading Heating Dealers:

"Coleman Leadership . . . Quality . . . Promotion And Complete Line Offer Greatest Range of Sales Possibilities!"

Mr. White gives the following basic key to profitable operation in the big post-war heating market. He says:

"We selected Coleman because it offers the greatest range of sales possibilities of *any* appliance line. Better heating for better health in tomorrow's homes is a 'must'. Coleman supplies this 'must' for low and medium priced homes—the big mass market.

"America's post-war market is quality-conscious. Coleman leads in quality—in comfort, in ease of use, and low-cost heating equipment that provides automatic convenience and cleanliness. This is why I expect Coleman leadership in sales to rise to unheard-of heights.

"Also, Coleman promotion is directing buying America to the Coleman dealer. He will ride the profit crest, because of Coleman's leadership. The wide-awake dealer makes Coleman his Number One demand item. As distributors, we appreciate this — the Coleman line helps us attract the kind of dealers who themselves are leaders."

Coleman franchise dealers are being appointed now by America's leading distributors for post-war sales of the complete Coleman lines of Gas Heating Equipment—including Floor Furnaces, Central Heat Plants, and Water Heaters. This franchise is awarded to aggressive dealers who can qualify and handle the volume of Coleman business they can easily develop. Write us for the name of your Coleman distributor, who can tell you the complete story of the Coleman opportunity in the waiting billion-dollar home-heating market. Coleman Lamp and Stove Co., Dept. G-22X, Wichita 1, Kansas.

THE "HOT" NAME IN HOME HEATING

Coleman

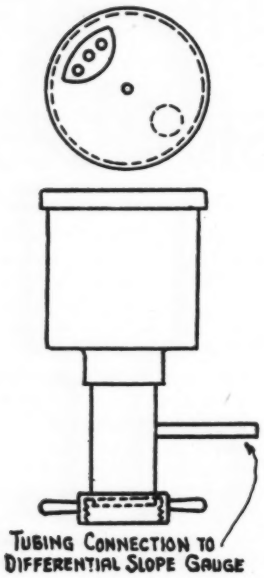
THE COLEMAN LAMP AND STOVE COMPANY • WICHITA 1 • CHICAGO 11 • PHILADELPHIA 8 • LOS ANGELES 54 • TORONTO, CANADA

OPERATING IDEAS

Test Cap

From AGA's "Report of Subcommittee on Wrinkles." W. R. FRASER, Michigan Consolidated Gas Co., Detroit, Chairman.

This device provides a means of testing 5 and 10-Lt. meters at the following rates of flow—30, 60, 90, and 375 cu. ft. per hour without having to remove test cap when bringing open and check together. The device is made of a brass tube which has been closed at one end and the other end reduced to ¾-in. Out of the ¾-in. end is a ¾-in. nipple with a connection for the differential slope gauge and a brass wing nut to connect it to the outlet side of the meter. Four orifices have been drilled through the top of the brass tube as shown. Three of the orifices pass 30 cu. ft. per hour each and the fourth 375 cu. ft. per hour. A brass cap with an opening, as shown, has been affixed to the top of the tube by means of a pin or screw. By revolving the cap it is possible to adjust the rate of flow to 30, 60, 90 or 375 cu. ft. per hour.



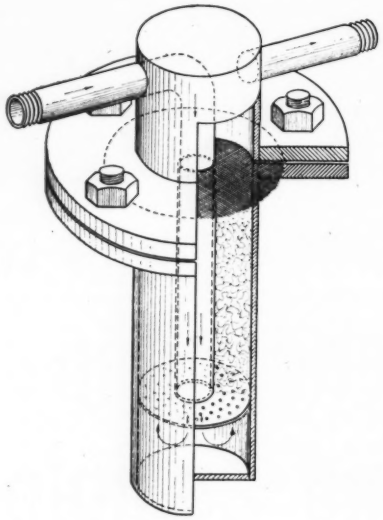
Thermostat Cleaner

BEN LONGSHORE, district foreman, Panhandle Eastern Pipe Line Co., Kansas City.

The cleaner is for installation on the inlet side of the thermostats on hot water heaters used at main line regulator stations.

In the past, there has been considerable trouble with scale and dirt getting under the valve in the thermostats and causing them to fail to shut off the flow of gas. In two or three instances, heaters have been found in which practically all the water was boiled out. The cleaner eliminates this trouble, and causes the heaters to give much better service.

The inlet and outlet connections can be made of any size pipe to fit fuel lines already in service.



Adjustable Crank Handle

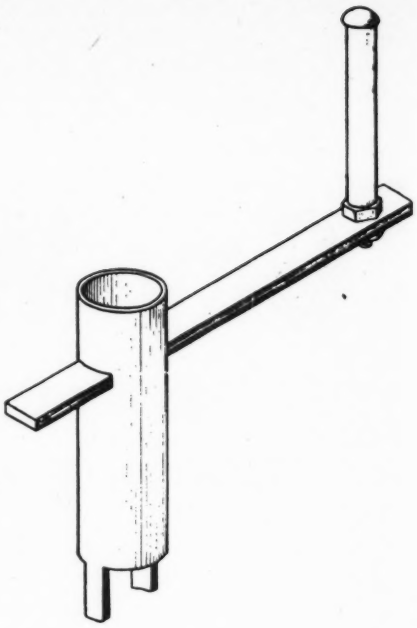
JOHN A. PLUMMER, oiler, Olpe Compressor Station, Panhandle Eastern Pipe Line Co.

This crank handle is for turning the edge type oil filters on Ingersoll-Rand KVG engines, to break the sludge from the filter plates.

Use a piece of 1-in. pipe, 5 in. long. Cut a slot 9/16 in. by 3/16 in. through both sides of the pipe, ½ in. from one end. On the opposite end, cut out a section of pipe 1 in. deep, so as to slip easily over the center part of the edge type filter handle.

Secure a piece of strap iron ½ in. by ⅛ of an in. 10 in. long, and drill a ⅜-in. hole ½ in. from one end. A ⅜-in. by 4½-in. bolt with round head and two nuts, one for each side of strap iron, is used as a handle with

GAS will pay $5 for useful ideas published on this page. Descriptions should be brief and accompanied by a reproductable drawin or photograph. Send ideas to GAS, 1709 W. 8th street, Los Angeles 14, Calif.



EDGE TYPE OIL FILTER CRANK HANDLE

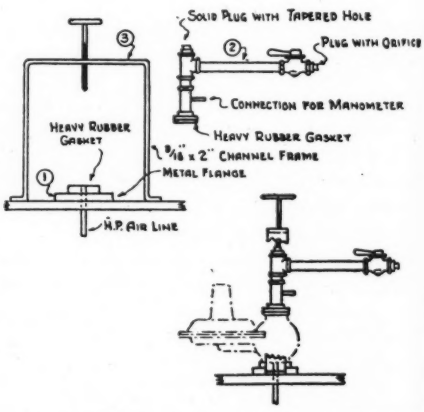
a 4-in. piece of ⅜-in. pipe as a covering for the bolt to make it easy on the operator's hands.

This tool has been in use for several months and has proved its worth both in efficiency and in safety.

Shop Testing Regulators

From AGA's "Report of Subcommittee on Wrinkles," W. R. FRASER, Michigan Consolidated Gas Co., Detroit, Chairman.

This apparatus was designed for the purpose of connecting service regulators to the high pressure air line and testing them at various rates of flow. The apparatus consists of three parts—



1. A high pressure air inlet on which is placed the regulator inlet.

2. A connection from the regulator outlet to adjust the various rates of flow.

3. A frame with a long screw, which was salvaged from a discarded gate valve and which holds the entire unit tightly in place while testing.

Precision fingers at work

SKILFUL fingers handle the small intricate parts of every Domestic Thermostat. Constant testing goes hand in hand with careful assembly.

It is such precision, plus patented Domestic principles, that have caused Domestic Thermostats to win nation wide acceptance in the gas industry.

When you sell a Domestic equipped water heater, you know your customer will have hot water at the desired temperature whenever wanted—you'll have customer satisfaction.

DOMESTIC THERMOSTAT COMPANY

156 W. PICO BLVD. • LOS ANGELES 15, CALIF.

NEW PRODUCTS

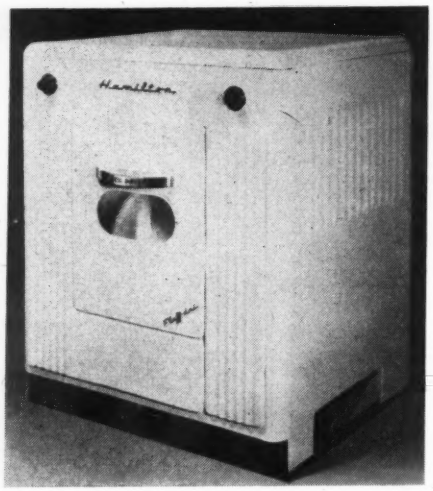
Clothes Dryer

Hamilton Manufacturing Co., Two Rivers, Wisc.

Model: Hamilton Automatic Clothes Dryer.

Application: Damp-dries average washer load of clothes in 15 to 25 minutes.

Description: Of sturdy steel construction with white dulux enamel finish, well insulated, has electric drive, is quiet in operation and requires no



lubrication. It will be available in both electric and gas models and the operating cost is low. Dimensions of both gas and electric models are 39-in. high; 31-in. wide, and 25-in. deep.

Complete drying of clothes takes slightly longer than 25 minutes. It holds a maximum washer load of 9 lbs. of dry clothes and up to 18 lbs. of wet clothes in one load. Automatic thermostat shuts off heating element, making it impossible to damage clothes.

Gasoil Burner

Surface Combustion Co., Toledo, Ohio.

Model: SC Gasoil Burner—Type ML.

Application: Makes it possible to burn both gas and oil simultaneously and to obtain advantages of the individual fuels for heating forgings without the disadvantages encountered when these fuels are used alone.

Description: With this burner the combustion rate of the oil is greatly accelerated, resulting in instantaneous release of the heat of combustion at high temperatures and with highly radiant luminous flame. Furnaces equipped with burner uniformly heat the charge at a greater rate with improved economy and less scaling.

With approximately 70% of the Btu input in the form of gas, the best results are obtained both from the standpoint of high flame temperature and highly radiant luminous flame which give rapid heat transfer to the work.

The introduction of oil into the gas flame produces an atmosphere in the furnace chamber which prevents the formation of a tight scale in high temperature heating operations. The scale formed in this atmosphere is loose and, therefore, easily removed.

Specific Installation: The Columbia Machine Works, Inc., one of Brooklyn Union Gas Co.'s industrial consumers, has in its forging shops 11 furnaces which formerly were fired with oil. Through the efforts of Rodney Sanford, industrial sales engineer, 10 of the furnaces now are being heated by burners which employ both gas and oil and the 11th furnace is being operated exclusively with gas. The installation is said to be the first major one in the East of this burner. General Motors, Chrysler and Ford are reported to be using the same type of burner.

The reduction in operating costs resulted from the fact that the new type burners eliminated the need for a large amount of compressed air (under 100 lb. pressure), the compressing of which required about two tons of coal daily.

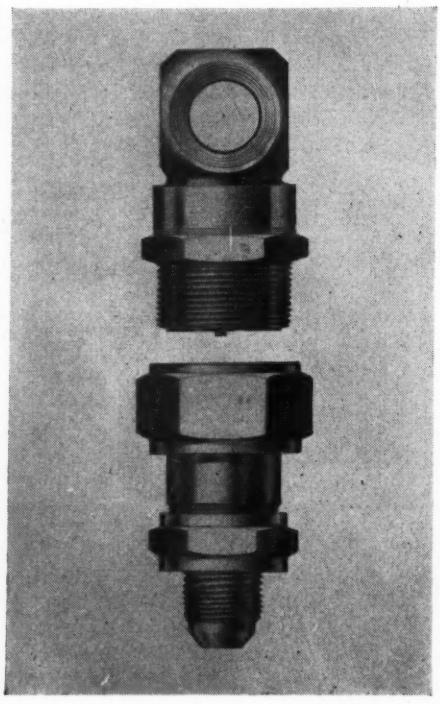
Self-Sealing Coupling

American Screw Products, 700 Avalon Blvd., Los Angeles (3).

Model: Disconnecting Self-Sealing Coupling.

Application: To provide leakproof connection when coupled for service.

Description: Item is said to withstand 2500 psi. after just ordinary finger tightening. Tests under severe handling conditions are reported to show that heavy construction of aluminum alloy body prevents distortion, and that jamming of spring-loaded shutoff valve is prevented. Springs are of heat treated steel. Lightweight cast phenolic poppets are positive-sealing in action. Synthetic gasket assures leakproof sealing. Available with AAf or AN threads.



Heater Control

Dravo Corp., 300 Penn Ave., Pittsburgh, Pa.

Model: Modulation Control Heater.

Application: Reduces starting and stopping with resulting economy in fuel and uniformity of heat output.

Description: A new method of controls for gas burning direct fired warm air heaters, which is a dual control by means of which at least 25% capacity of the heater is worked on a straight "on-off" basis and the remainder modulated to fit the heat requirements.

The modulated control is also useful for tempering large volumes of ventilating air frequently used in connection with heating systems of this type.

Catalogs

• **The Stacey Bros., Gas Construction Co.,** 5535 Vine Street, Cincinnati, Ohio, has issued a 16 page bulletin presenting facts and detailed information on the development of corrosion—and how to combat it—in gas holders.

• **Fischer Governor Co.,** Marshalltown, Iowa, has released a new booklet on the subject of "Time Temperature District Gas Regulators" written by Charles D. Peterson of that company. The book is detailed in its description of the application and operation of this type of control equipment and is illustrated with drawings and installation photographs. Copies may be procured by writing to Fischer Governor Co., Dept. A, Marshalltown, Iowa.

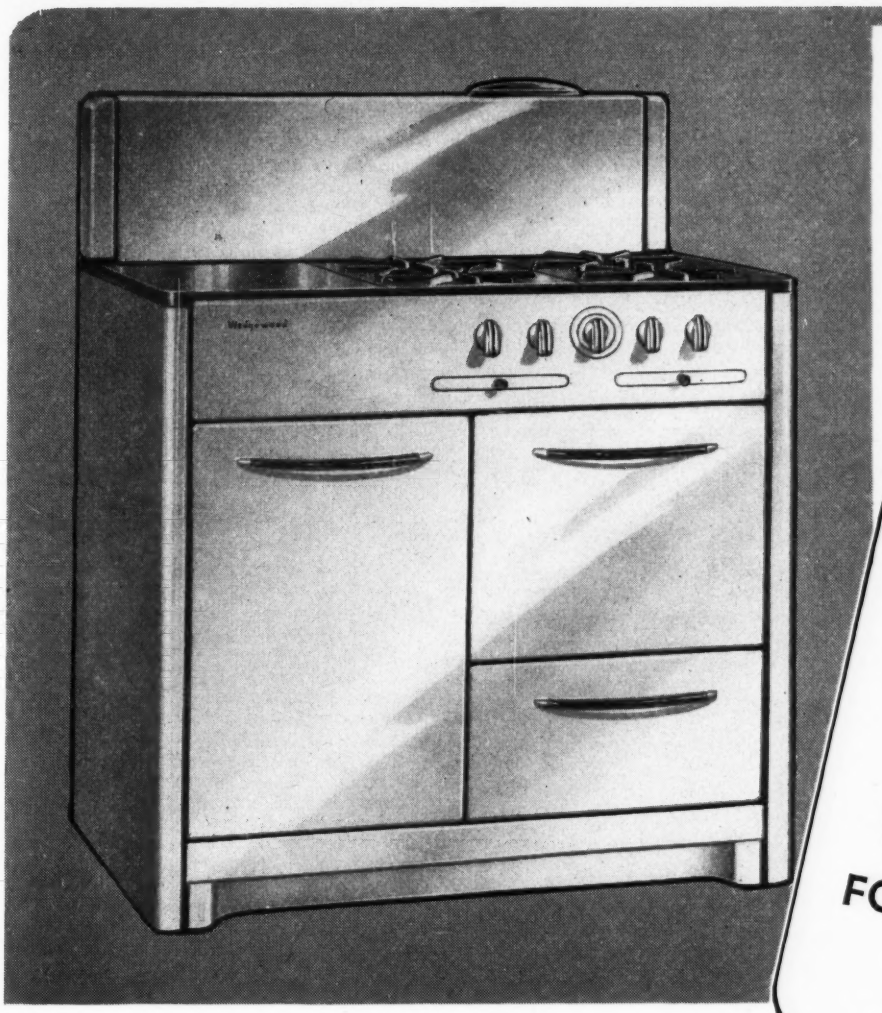
• **Cooling Tower (Atmospheric Type):** Contains data for calculating cooling tower sizes, essential points in cooling tower selection and details of construction and operation of Fluor aerator cooling towers. Illustrated with photographs of typical installations, section drawings and performance charts; 20 pages. Available on request to The Fluor Corp., Ltd., 2500 South Atlantic Boulevard, Los Angeles 11, Calif.

• **The Ingersoll-Rand Co.,** 11 Broadway, New York 4, N. Y., has published the following three pamphlets:

"Barometric Condensers"—which covers both the disc-flow and ejector-jet types, explaining the uses, advantages and operation of each;

"Air-Operated Tools for Maintenance, Construction, Demolition"—which shows the line of I-R air tools and portable compressors available for speeding up work of the maintenance man;

"Compressors"—a catalog describing KVG compressors and listing their basic features and advantages. The KVG is an addition to earlier and smaller units, brought out to fulfill the demand for larger compressors of this type for refining services such as repressuring, recycling and gas distribution.



DEALERS' CHOICE FOR QUALITY!

DEALERS EVERYWHERE ACCLAIM WEDGEWOOD!
...THE MODERN RANGE THAT MAKES FRIENDS FOR GAS

➡When a dealer sells WEDGEWOOD he *knows* he is making friends for his store. He is also making friends for Gas ...the modern fuel. He has the confidence that over half-a-century of Wedgewood progress gives him. For Wedgewood's up-to-the-minute styling, convenience and all-'round excellence of performance, based on superior quality features, have met the West's most exacting cooking requirements.

That is why women today naturally turn to the dependable Wedgewood for aid in preparing perfect meals. That is why the nationally famous Wedgewood is always "Dealers' Choice" for quality.

MODERNS PREFER GAS

FOR ALL GASES, INCLUDING LP (LIQUEFIED PETROLEUM) GAS

WEDGEWOOD THE MODERN GAS RANGE

JAMES GRAHAM MANUFACTURING CO.

LOS ANGELES ★ SAN FRANCISCO ★ NEWARK, CALIFORNIA ★ PORTLAND, OREGON

FPC Sets May 1 for First Gas Investigation Hearing

THE first public hearing in the federal power commission's fact-finding investigation into the conservation and utilization of natural gas, will be held May 1, in Kansas City, Mo., according to an announcement made by the FPC on Feb. 18.

The order follows an analysis of responses received from interested parties following the institution of the investigation, and views and suggestions presented by representatives of principally interested groups during information conferences with representatives of the commission. The order states that the responses and conferences indicate it is advisable to hold public hearings in the principal gas producing regions in order to provide greater opportunity for participation with a minimum of travel. Conservation authorities of several states have in preparation statistical and other information which they desire to submit in the investigation, the order adds.

Procedure for participation in the hearings is provided in the order, which states: "All persons desiring to participate in such hearings shall file with the commission at least 30 days before the date set for the hearing at which they desire to appear a written request, containing a brief synopsis of the evidence they desire to present."

The hearing is in furtherance of the investigation instituted on Sept. 22, 1944 by the commission on its own motion, into the extent and probable life of the nation's natural gas reserves; present and prospective measures for preventing waste and prolonging the life of such reserves; the present and probable future utilization of natural gas for domestic, commercial and industrial purposes; the extent, character and results of the competition of natural gas with other fuels; and such related matters as may be helpful in the administration of the natural gas act or in determining what additional legislation, if any, should be recommended.

WPB Outlines Procedure For Deferment Requests

The Office of War Utilities, WPB, on Feb. 24 issued an administrative letter covering new procedure for deferment of key utility employees under 30 years of age.

Local draft boards will not ordinarily honor requests for deferment unless certified by an authorized Certifying Agency. WPB is the Certifying Agency for all privately owned domestic utility companies. Requests for deferments should list men in the order of their importance to the utility's operation. Copies of the letter (GPO -War Board 14515) (INFL -810—2-23-45) can be secured from WPB.

New Burner Design Bulletin Analyzes Temperature Factor

Publication of the latest research bulletin of a series on technical factors affecting gas burner design has been completed by the A.G.A. testing laboratories and distribution made to the gas industry.

The new research bulletin, No. 34 "Temperature As a Factor in the Design of Aerated Gas Burners," is the eighth dealing specifically with burner research to be released under the supervision of the association's committee on Domestic Gas Research. Data presented are complementary to those given in preceding bulletins of the series. Together they further advance the technical foundation already established towards a scientific approach to the problem of burner design.

Characteristic flame limits are analyzed in terms of air-gas mixture temperatures within the burner head and effects of elevated temperatures on lifting, yellow tip, and flash-back presented in detail. Formulas are developed for the calculation of flame inner cone height, applicable to natural, manufactured and butane gases.

A section of the new bulletin is devoted to discussion of further study of burners injecting all air necessary for combustion as primary air. Temperatures of air-gas mixtures normally encountered in aerated burners of numerous contemporary appliances are likewise presented.

WPB Curtails Carbon Black Consumption Indefinitely

Steps to curtail carbon black consumption to the extent of 10,000,000 lbs. per month were announced Feb. 14 by James F. Clark, director of the War Production Board's Rubber Bureau.

"The splendid set-up in production to help meet the increased tire requirements of the armed forces has brought us face to face with an immediate, critical shortage of carbon black," Mr. Clark said. "New facilities to produce additional carbon black are now being planned and expedited by WPB's Chemicals Bureau, but these new facilities are a future answer rather than a help to the shortage which is with us today. Conservation—by reducing the amount of carbon black now going into rubber products—is immediately required until the supply can be adequately increased. The present restrictions will obviously have to remain in force until the new supply becomes available—possibly late in the spring."

Manpower Commission Issues Report on Gas

W. O. W. Lee, Bureau of Manpower Utilization, War Manpower Commission, 1778 Pennsylvania Ave., N. W. Washington, D. C., has announced that a pamphlet "Case History Reports for Natural and Manufactured Gas Industry" prepared by the American Gas Association, is now available. To order copies of this report, in addition to the title, refer to WMUS-IX-48.

The report covers the following ways and means of increasing production while saving manpower: Manpower Saving Devices; Changes in Operating; Plant Conditions and Policies; and Absenteeism and Turnover.

Order Your Copy Now

IT'S OFF THE PRESSES!

THE BOTTLED GAS MANUAL

A FIELD GUIDE AND TEXT BOOK FOR DEALERS, SERVICEMEN AND SALESMEN WHO HANDLE LP-GASES, EQUIPMENT, APPLIANCES.

By C. C. TURNER

• 352 PAGES •

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Every month, for the past three years, chapters of THE BOTTLED GAS MANUAL have appeared in BUTANE-PROPANE NEWS.

Now in book form . . . this is a handy reference for every dealer, salesman and service man.

Answers to everyday questions about LP-gases, equipment and appliances. Quick solutions to hundreds of technical problems.

On the job, it aids field men with installation, maintenance and repairs. In salesman's pocket, it provides prompt answers to consumers' needs. On dealer's desk, it helps compute and control operating costs.

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Gentlemen: Please send me.....copies of The Bottled Gas Manual for which I am enclosing check (or money order) for $.....

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Company .....

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YOUR POSTWAR DOMESTIC GAS MARKET APPLIANCE SATURATION

The promise of a large postwar Gas-appliance market is commonplace knowledge to all of us in the Gas industry. But the question constantly occurs—what common denominators will enable us to comprehend better this potential appliance market and prepare us to serve it?

Not one but several factors have created Tomorrow's appliance market. They are: (1) the wartime necessities that have curtailed the production and use of new appliances; (2) the inroads of obsolescence on existing appliances, and (3) the enormous population growth in California during the last three years with a consequent demand for all kinds of Gas appliances.

In order to understand the full significance of the future Gas-appliance market, the present saturation of Gas appliances should be examined. The following figures are taken from a recent study of saturation in P. G. and E. territory as of December 1943, for residential customers, excluding apartment customers:

	Appliances	Percentages
Ranges	603,859	91.7
Automatic Water Heaters	447,132	67.9
Non-automatic Water Heaters	154,056	23.4
Central Furnaces	112,377	17.1
Floor Furnaces	166,436	25.3
Circulators	153,498	23.3
Other Room Type Heaters	55,652	8.5

The above figures are based on 620,117 Gas customers of the P. G. and E. and 38,312 customers receiving Gas service from other companies.

★

This is the third of a series of ads devoted to after - the - war merchandising problems of Domestic Gas Equipment.

★

P. G. and E. PACIFIC GAS AND ELECTRIC COMPANY

Houston Gas Appliance Sales Hit $5,000,000 Mark

During the past decade the sales of gas household appliances by the Houston Natural Gas System's cooperating dealers have totaled more than $5,000,000 in spite of the curtailment of the manufacture of gas appliances since the war.

The total appliances sold for the past 10-year period are: Ranges 22,719; water heaters 17,621; refrigerators 5340; gas heaters 30,122; central or floor furnaces 1522.

In 1944 only the sale of gas heaters showed an increase over the previous year. The sale of refrigerators and water heaters dropped considerably, while the sale of ranges and floor furnaces held close to 1943 levels.

The best all-around records in the sale of appliances by districts during 1944 were compiled at Texas City and Alice.

Plan Postwar "All Gas" Home

The February issue of "Arts and Architecture" will carry an article on an "all-gas" house, which will be constructed under the supervision of the magazine as one of eight "case study" houses in the Los Angeles area immediately following the war. Two of the houses are planned as "all gas"; two as "all electric"; four will use both fuels, each in its proper sphere.

CLEVELANDS'...

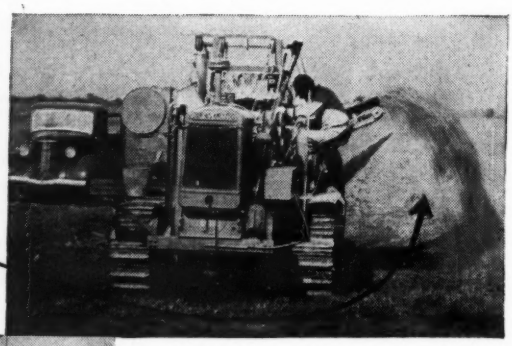
SPEED — MOBILITY — MANEUVERABILITY

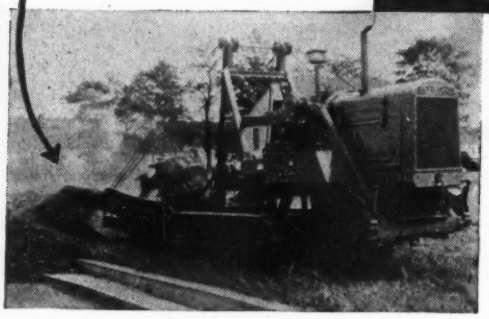
Get Them to the Job and Get the Job Done FASTER

←CLEVELANDS' Compactness and eliminated Dead Weight afford full truck or trailer Mobility.

CLEVELANDS' Speed results from its numerous Graduated Crawler and Wheel Speed combinations, plus its High Capacity Digging Wheel...

More Dirt Off the Conveyor is Proof





←CLEVELANDS' Maneuverability is due to its simplified Brake Controlled Differential Steering. Full speed range in either direction and balanced weight distribution.

You'll find that in CLEVELANDS every operation incidental to mechanical Trenching has been speeded up, assuring you most trench, in most places at least cost. That's why you'll want CLEVELANDS on your Postwar Jobs...

"CLEVELANDS" MAKE THE EARTH FLY

THE CLEVELAND TRENCHER CO.

20100 St. Clair Ave., Cleveland 17, Ohio

ASSOCIATIONS

ODT Ruling Greenlights Measurement Course

After receiving an O. D. T. ruling that the Southwestern Gas Measurement Short Course is not considered a convention but an educational project, directors of the course decided to go ahead with plans for its 1945 meeting, set for April 17, 18 and 19, at the University of Oklahoma, Norman, Okla.

The 1943 short course was called off because of transportation difficulties, but the demand for a 1944 meeting became so great that it was held in June of that year with an attendance of 524.

As in former years, problems in connection with measurement and regulation of gas, will have first place on the program. Plans for the 1945 short course were made at a recent meeting of the General Committee.

Candian Ass'n Schedules June Meeting

The 38th Annual Convention of the Canadian Gas Association will be held June 19 to 22nd inclusive, 1945, at the Monoir Richelieu hotel, Murray Bay, Quebec.

Convention papers in the main will be dispensed with this year, but in their place will appear prominent gas men who will review the most outstanding developments within the gas industry the past few years and will impart constructive ideas for the postwar period ahead.

Pennsylvania Ass'n Names Committee Chairmen

The directors and president of the Pennsylvania Natural Gas Men's Association have appointed the following committees and their chairmen for 1945: Finance, H. D. Borger, People's Natural Gas Co.; Membership, H. H. Pigott, Equitable Gas Co.; Policy, Dan S. Kennan, Carnegie Natural Gas Co.; Postwar Planning, Christy Payne, Jr., People's Natural Gas Co.; Program, E. O. Schillhahn; Technical, Dr. R. W. Miller, People's Natural Gas Co.

Independent Gas Ass'n Opens Offices in Washington

Washington offices of the Independent Natural Gas Association of America were opened early in February, at Suite 305 at 1700, I Street N. W., operating under direction of John A. Ferguson, executive director. The Association will continue to maintain its mid-continent offices at Oklahoma City, in charge of Charles L. Orr.

NEGA Cancels Meeting

The NEGA 1945 Annual Meeting, scheduled for Boston in March, has been cancelled by the directors. Election of officers and directors will be conducted by mail in March.

• **The Bastian-Morley Co., Inc.,** La Porte, Ind., manufacturers of Crane gas water heaters, is among 70-odd companies producing the navy's T-6 Pontoon, useful in making landings at places where otherwise would be impractical.

New Requirements for Gum Protective Devices Issued

Distribution has been made to manufacturers of certified gas appliances and accessories of new listing requirements covering gum protective devices for use on manufactured gas appliances.

These requirements were developed in recognition of the importance of the pilot outage problem. Following much study and research, it was found possible to formulate constructional and performance features with which devices for protection of constant burning pilots should comply. Exhaustive tests have demonstrated that accessories meeting the provisions established will afford effective protection against gum forming constituents and other material such as dust and dirt. The new requirements are now in the hands of the American Standards Association for adoption as American Standard. They become effective Jan. 1, 1946.

In order to provide suitable pilot protection on appliances used for manufactured gas service, the decision has been reached that gum protective devices complying with the new standards shall be provided for constant burning pilots. This ruling is effective for all such appliances, with the exception of gas water heaters, on Jan. 1, 1946. For water heaters it becomes effective one year later. Suitable revisions to approval standards to accomplish the purpose desired have been distributed to the industry.

PAW Moves To Conserve Propane

Deputy Petroleum Administrator Ralph K. Davies has announced that increasing demands for propane as fuel in war plants and serious shortages of transportation facilities have made it necessary for PAW to take three steps to conserve propane:

1. Applications for new installations of equipment using propane will not be approved.

2. Applications for the installation of equipment used to connect propane-consuming appliances with existing liquefied petroleum gas systems will not be approved.

3. Liquefied petroleum gas dealers now must apply to PAW for authorization to install or reinstall any type of used L-P gas equipment for purposes other than maintenance and repair. Applications of this type should be submitted to PAW on Form WPB-809. Action calling for the PAW authorization was taken by amending war production board limitation order L-86, which rescinds sub-paragraph (d) (3).

The first two of the three steps taken by PAW apply throughout the country except in the West Coast States (PAW District 5).

Wolverine to Dissolve

Stockholders of the Wolverine Natural Gas Corp., according to an announcement made in Grand Rapids, Mich., recently by corporation officials, have approved plans for dissolution of the firm. A week earlier, stockholders approved the sale of oil wells in the Walker field and gas wells in the Six Lakes field, both Michigan holdings. It was stated that an initial liquidating dividend of $1.50 a share would become available in January, with other dividends becoming effective as remaining assets of the corporation were disposed of. The statement showed that 204,228 shares had been issued, with most of the stock being held by Michigan investors.

Winnipeg Co. Shows Growth

Operations of the gas department of the Winnipeg Electric Co. at Winnipeg, Manitoba continue to expand steadily under wartime conditions, according to a recent statement by company officials.

Industrial gas sales are running slightly over last year's record figures. The demand for domestic coke still exceeds the supply.

Day & Night Manufacturing Joins Dresser Group

Stockholders of the Day & Night Manufacturing Co., Monrovia, Calif., last month approved affiliation of that company with Dresser Industries, Inc. Day & Night, manufacturers of gas water heaters, gas space heating appliances and water coolers, has been in business in Monrovia since 1909.

Bryant Heater Co., of Cleveland, has been a member company of Dresser ince 1933. The recent affiliation of The Payne Furnace and Supply Co., Beverly Hills, Calif., and of Day & Night broadens Dresser's activities in the gas appliance business.

LEADERSHIP—

that saves you money

It has always been the policy of Stacey Brothers to *improve* gas holders. It is natural, therefore, that our holders have won recognition as being unequalled for design, efficiency, and quality of workmanship.

Our latest development is the All-Welded Panel Type Wet Seal Holder. This modern holder offers you the triple benefits of REDUCED MAINTENANCE COSTS . . . GREATER STRENGTH . . . LONGER LIFE. The costly and troublesome interior corrosion problems usually associated with wet seal holders have been reduced to a negligible factor in this new Stacey Brothers Gas Holder. Let us figure now on your post-war needs.

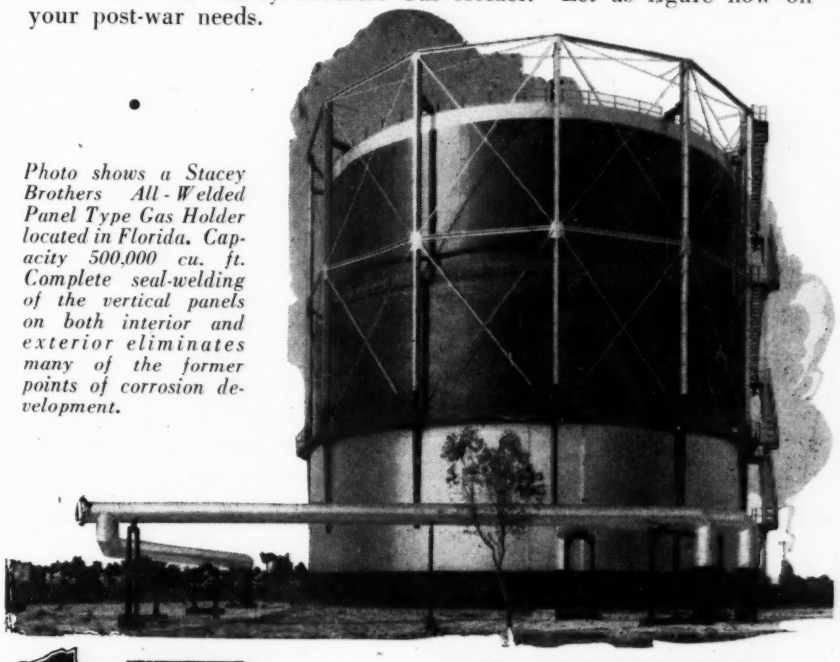


Photo shows a Stacey Brothers All-Welded Panel Type Gas Holder located in Florida. Capacity 500,000 cu. ft. Complete seal-welding of the vertical panels on both interior and exterior eliminates many of the former points of corrosion development.

The STACEY BROS. GAS CONSTRUCTION CO.

One of the Dresser Industries

5535 Vine St., Cincinnati 16, Ohio

ALL-WELDED PANEL TYPE

GAS HOLDERS

Stacey Brothers

ENGINEERS • FABRICATORS
ERECTORS • RECOGNIZED
EXPERIENCE & FACILITIES

P·C·G·A

TEL-U-TYPE

FLASH NEWS OF YOUR ASSOCIATION

The gas industry of the West is not getting all the favorable publicity to which it is entitled and which can be obtained. Hence, the Cooperative Advertising Committee has resumed its News and Feature Service, interrupted by the war.

Make the PCGA your "clearing house" for tips on: New or unusual industrial and commercial installations, especially in essential industries; research and experiments looking towards postwar sales and service; improved equipment; refinements in appliances; trends and forecasts.

When desired, arrangements will be made to "ghost-write" (or rewrite from notes and reference material) technical features for the trade press. Articles with a competitive or controversial slant are often especially desired by editors.

Please give your suggestions to Clifford Johnstone, managing director, Pacific Coast Gas Association, 447 Sutter St., San Francisco 8.

Watch This Column Monthly

THE WEST PREFERS GAS

Who Will Sell Ranges in Pittsburgh Postwar?

THE Pittsburgh Press recently concluded a market study on the subject of "Who Will Sell Mrs. Public Her New Gas Range?" Two questions were asked: (1) "Where would you probably buy your next range?" (2) "Where did you buy your present range?"

Answering the interviewer's first question, "Where would you probably buy your next range"—38.1% of the 3145 families interviewed, answered—"Don't know!"

Despite advertising, window displays, many range customers of 7 years ago—nearly 4 out of 10 people did not know where they would buy their new range.

What about the other 60%—do they know where they are going to buy? The market study reports that 18.5% of the families will probably buy their next range from a department store. The furniture store is next in preferenec with a 17.4% vote. The public utility is considered the logical place for purchase by 10.4% of the families. The syndicate store is given a 7.9% vote and the independent appliance store received 6.1% of the tabulation. (See chart.)

The interviewers making this market study then asked these thousands of families scattered throughout Pittsburgh and 59 surrounding boroughs and townships—"Where did you buy your present range?"

Only 9.4% did not know! And of definite interest to dealers, the survey showed that: (1) 25.8% of the ranges in current use had been purchased from furniture stores; (2) The department store got 19.2% of the vote; (3) the public utility 9.9% of the vote; (4) the syndicate store 8.3%. Note the complete picture as in the chart.

The survey indicates that 25.8% of ranges in use were purchased from furniture stores, yet that type of dealer ranks only 17.4% of the votes as the probable source for the next range. Why? The department store comparison, the syndicate and the utility comparisons are about the same. The question is:—Which way will that large 38.1% of all the families interviewed turn for their new range? This customer and prospect reaction will depend on the individual effort put out by the various types of sales outlets.

The Pittsburgh Market

Incidentally, 9 out of 10 families use gas ranges!

And, 92.5% of the ranges were owned by the individual families—

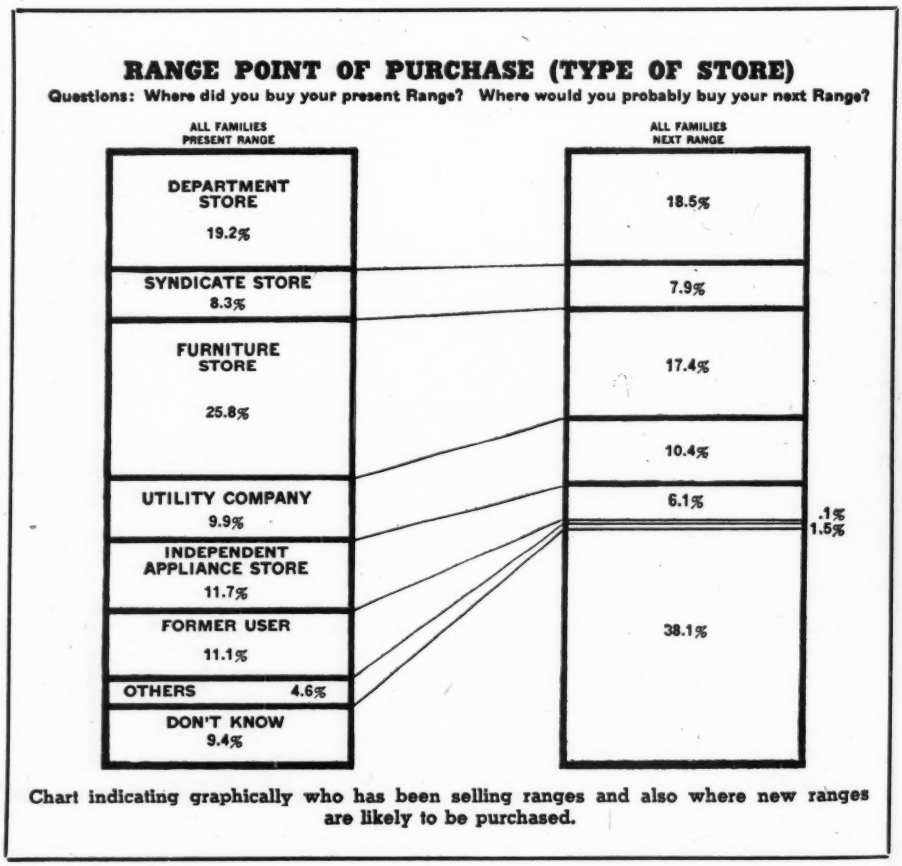
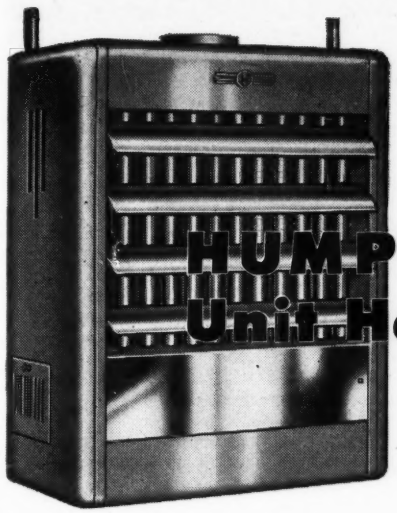


Chart indicating graphically who has been selling ranges and also where new ranges are likely to be purchased.



HUMPHREY
Unit Heaters

TODAY WE ARE BUILDING THE TOOLS OF WAR.. TOMORROW WE WILL AGAIN BUILD THE COMFORTS OF PEACE

Load Builders for the FUTURE

With the facilities of the Gas Industry taxed to the limit supplying Gas for the war effort, little thought need be given now to the securing of GAS Loads. However, when again peace comes, the expanded capacity of many gas plants will require rapid conversion from the demands of war manufacturing to those of peacetime needs. And when this time arrives, you will find smartly styled, carefully engineered Humphrey Appliances ready to help build profitable Gas Loads.

HUMPHREY
Radiantfires

HUMPHREY
Radiantfire
Circulators

GENERAL GAS LIGHT
COMPANY
KALAMAZOO, MICHIGAN

REMEMBER A HUMPHREY PRODUCT THIS MARK OF QUALITY

23 WARREN ST., NEW YORK CITY • 2nd UNIT SANTA FE BLDG., DALLAS • 225 ELEVENTH ST., SAN FRANCISCO

landlords supplying ranges in only 6.9% of the cases.

That new ranges will be bought seems a certainty—for the market study revealed that 55.6% of the ranges which were bought new, were purchased in 1937 or earlier! Seven years old now! Adding 7.9% for the ranges purchased in 1938 and 8.9% for the ranges bought in 1939—it is found that 72.4% of the ranges in current use are more than five years old! These ranges lack many modern features of the appliances produced in 1940 and 1941, and to be featured in the ranges soon to be available.

API Reports Nation's Oil Reserves Up 2 Billion Bbls.

More than two billion barrels of new petroleum reserves were added to the nation's oil supply in 1944, according to API's Committee on Petroleum Reserves.

Proved reserves total 20,453,231,000 barrels. Despite a record crude oil production of 1,678,421,000 barrels during the year, the net gain in the proved oil reserves of the country amounted to 389,079,000 barrels in 1944.

In 1944 the new reserves resulting from discovery amount to 511,000,000 barrels, the highest figure since 1939, while additions to reserves by development added another 1,556,000,000 barrels. Crude oil withdrawals from reserve amounted to 24.2% more than those of prewar 1941.

During 1944 Alabama became the 26th oil producing state; Louisiana and Mississippi lead all other states in reserves added by discovery; Texas with reserves of 11,375,000,000 million barrels has 55.6% of U. S. oil reserves, with California, Louisiana, Oklahoma, Kansas, Wyoming and New Mexico following in the order named.

Oklahoma Continues Support Of Oil Compact Commission

Action of the Oklahoma Legislature in passing and of Governor Kerr in signing, H. B. 133, assures financing of the Interstate Oil Compact Commission and the conservation department of the Oklahoma Corporation Commission for the ensuing two years.

The bill signed by the Governor, Feb. 17, levies a special tax of one mill per barrel on oil produced in the state, one sixth of which goes to the compact commission and the remaining five-sixths to the conservation department.

Earl Foster, secretary of the compact commission, says that proposals to approve the joining of the compact are pending before legislatures of Wyoming, Georgia, Indiana, Mississippi and West Virginia, and that Montana is favorable to joining. Secretary Foster appeared before the Oil and Gas committee of the Florida legislature to acquaint it with the work of the compact commission. The committee reported favorably to the legislature on the proposal.

The compact commission was scheduled to decide at its March 1 executive committee meeting, whether a spring quarterly meeting will be held, in view of cancellation of many 1945 meetings because of travel restrictions.

Drilling Rules for Texas Areas Revised by PAW

Changed regulations for natural gas well drilling and development operations in several Texas counties were announced last month by PAW. In the counties named, material for drilling to a depth of 1500 ft. may be used on units of 80 acres; to 3500 ft. on units of 160 acres and to 5500 ft. on units of 320 acres. Previously 640 acres were required for wells regardless of depth. Now 640 acres is required only for wells deeper than 5500 ft.

Payneheat Offers Booklet

Payne Furnace & Supply Co., Inc., Beverly Hills, Calif., has issued a booklet, "New Frontiers for Pioneers," which relates the history and growth of Payneheat since its establishment in a converted livery stable in 1914 to its present-day coast to coast distribution, war production and four major factory expansions.

U-7 Procedure Changed

Utilities Order U-7 was amended last month by requiring gas companies to notify WPB in Washington by telegram and local WPB offices by telephone of curtailment and restoration of gas service to consumers pursuant to paragraphs (c) (1) (vi) or (vii) of the order.

LIKE CARRYING A LABORATORY IN ONE HAND
The ARCCO-ANUBIS PORTABLE GAS BALANCE weighs only 20 pounds complete with carrying case—yet measures specific gravity of gases in the field with laboratory accuracy.
Ruggedly constructed and entirely self-contained, this gas balance will stay accurate in the hardest field service. There is no tinkering—it is easy to operate, easy to read, and no accessories are required. Hundreds in use by major companies.
SEND FOR BULLETIN NO. 101
AMERICAN RECORDING CHART CO.
3113 E. 11th St. Los Angeles 23, Calif.
SEND FOR COMPLETE LIST OF ARCCO CHARTS

NEW GAS PRODUCTION

• Canada's search for new natural gas and oil reserves has extended to the province of Nova Scotia on the east coast where the newly-organized Nova Scotia Oil & Gas Co., Ltd., headed by Samuel C. Nickle, veteran Alberta oil man, has launched a drilling program.

The company has drilling rights from the provincial department of Mines to 553,000 acres in the western section of the province, in Hants County. First well was spudded in on Oct. 16.

A geological survey a few years ago by Prof. Merle F. Bancroft of Acadia University, Wolfville, Nova Scotia, is the basis of the new venture. The drillers hope to reach an extension of oil and gas-bearing strata already tapped near Moncton, in the neighboring province of New Brunswick. Mr. Nickle says that the company will test the entire area, even if no success is met in the first venture.

• Commoil, Ltd., Calgary, Alberta, now is installing a low-pressure pick-up gas system in the southern part of Turner Valley, in the territory in which the company's wells are located. This will enable the company to enter the Calgary gas market pro-rata with other companies, and it expected, the company says, to add a material amount to revenue.

• Recent developments by the **Phillips Petroleum Co.**, in the Texas Panhandle sector have extended the vast Hugoton gas field into Hansford and Sherman counties, Texas, making it a three-state producing area, embracing counties in Southwestern Kansas, Northwestern Oklahoma and Texas.

Since the first of the year several wells have been completed in the southern tier townships of Texas County, Okla. Across the line in Texas completions of 15 gas wells have been reported.

• A new gas pool was opened recently by the **Texas Co.** in Southern Pottowatomie County, Okla., which brought in a well which tested 15,000,000 cu. ft., per day at 2878 ft.

Prospects that the West Edmond oil field, northwest of Oklahoma City, may also develop into an important gas producing area, developed from discovery of an estimated 6,500,000 cu. ft. of gas, brought in Jan. 18 by Phillips Petroleum Co., and Kerlyn Oil Co. The well also yielded 240 barrels daily of high grade distillate.

Brooklyn Union Weathers Cold Wave with 97-year Peak

Brooklyn Union Gas Co., put to the severest test in its 97 years by the January cold wave, maintained service to all customers with a peak two-day send out of 301,645,000 cu. ft.

Service was maintained by: (1) The cooperation of all employees in operating gas making equipment overtime; (2) Through the cooperation of Consolidated Edison Co., which furnished Brooklyn Union with a total of 38,733,000 cu. ft. during the period.

Some years ago, in anticipation of an emergency situation, Brooklyn Union and Consolidated Edison laid a main which ties together the transmission systems of the two companies. A great deal of work was necessary on the part of Consolidated Edison in starting up production apparatus and organizing pumping procedure.

The cold wave also added work for service men, whose forces have been depleted about 30% by the war. In five days, 3352 "no gas" and "poor supply" complaints were received from customers. In addition, other types of complaints rose, producing a total of 16,198 orders of all types.

Thomas J. Perry, superintendent of customer service, reports that no one was without heat for more than a few hours and few, if any, dinners were delayed.

After the emergency, the company inserted an advertisement in the newspapers thanking the customers who voluntarily curtailed their use of gas, and the BU and Consolidated employees who stuck to their jobs.

Drilling Regulations Changed

Deputy Petroleum Administrator Ralph K. Davies recently announced changes in spacing regulations for natural gas well drilling and development operations in 42 counties in North and West Central Texas and West Central Arkansas, and in San Juan county, New Mexico.

• Non-metallic Transite Flue Pipe not only is rustproof, it is light in weight . . . easy to install and support . . . can be cut to fit on the job. Neat and attractive in appearance, it needs no painting. 2" to 12" sizes; round and oval. Complete line of fittings and accessories.

For details, write for booklet TR-13A. Johns-Manville, 22 East 40th Street, New York 16, N. Y.

JM JOHNS-MANVILLE PRODUCTS

Johns-Manville **TRANSITE FLUE PIPE** For venting gas-burning appliances

PEOPLE

• **R. W. Peterson,** chairman of the Wisconsin Public Service Commission since 1939, has resigned Feb. 1 to accept a position in Washington, D. C. as general manager of Public Utilities Reports, Inc., a publishing house that markets a utility law reporting service.

• **Ellis L. Phillips** has retired as chairman of the board and a director of the Long Island Lighting Co., New York. He also retired from the respective boards of subsidiaries of the company. Phillip's retirement culminates 35 years of service with Long Island Lighting.

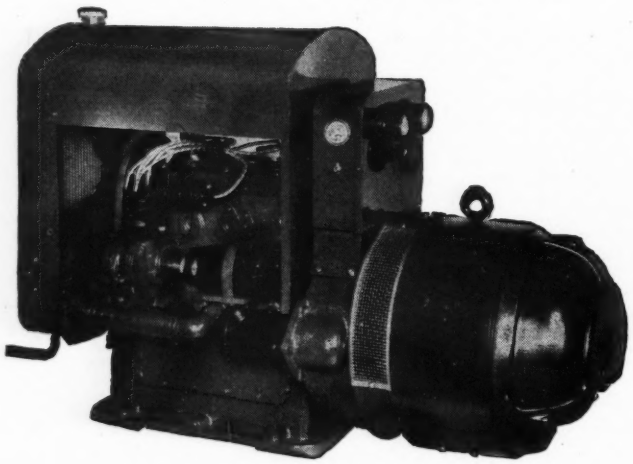
• **Edward W. Morehouse** has been elected to the board of directors of the Jersey Central Power & Light Co., Asbury Park. Morehouse has since 1940 been chief economist and chief technical consultant for the trustees of the Associated Gas and Electric Corp., New York. He has also served as a director of Virginia Public Service Co., and is at present a director of NY PA NJ Utilities Co. and the General Gas and Electric Corp. Since 1940 he has been a consultant of the office of war utilities, war production board.

• **Herbert S. Howard** has been elected an assistant comptroller of Niagrara Hudson Power Corp., New York by the board of directors. He has been manager of the tax and audit departments of the Niagara Hudson System since 1942 and was associated with Henry W. Breyer Co., of Philadelphia, from 1935 to 1942 and with the Philadelphia office of Price, Waterhouse & Co. from 1925 to 1935.

• **Arthur F. Bridge,** general manager of Southern Counties Gas Co., has announced the following personnel changes:

Justin M. Kennedy, manager of the Ventura district since 1940, will replace Fred C. Merker (deceased) at Santa Ana; **Frank B. Wright,** formerly superintendent of Santa Monica Bay district will become district manager at Ventura; **R. C. Merrick,** superintendent in the eastern district will take Wright's place in Santa Monica; and **Bernard A. Devine,** of the engineering department, Los Angeles, will be sent to Pomona as eastern district superintendent.

PIPE LINE PROTECTION FOR VICTORY AND BEYOND



JACOBS' NEW 1945 MODEL CATHODIC UNIT OPERATED ON NATURAL GAS, BUTANE OR GASOLINE—60 to 90 days delivery. D.C. 5 K.W. 150 AMPERES 10 to 40 VOLTS A.C. 5 K.W. 110 VOLT (FOR RECTIFIED CATHODIC SYSTEMS). SLOW SPEED, HEAVY DUTY CONSTRUCTION THROUGHOUT. Electric started. Automatically stopped for low oil, overheating or generator failure. Extra large special design air cleaner, Marvel overhead oiler, Fram oil filter, extra large crankcase oil reservoir. Designed and built to give dependable uninterupted service year after year.

Thousands of miles of American and foreign pipe lines are being cathodically protected by Jacobs units. Write for literature.

THE JACOBS WIND ELECTRIC COMPANY, INC.
Pipe Line Division: MINNEAPOLIS 11, MINNESOTA, U.S.A.
America's Leading Manufacturer of Pipe Line Cathodic Plants

• **C. L. Brockschmidt** has resigned from WPB and on March 1 joined the staff of the Standard Oil Co. of New Jersey, as gas engineer in foreign marketing coordination in New York City. Brockschmidt has been connected with the war production board as a natural gas engineer since 1942 and for the past 18 months has been chief of the supply and allocation section, natural gas division. From 1931 to 1942 he was employed by the Mississippi River Fuel Corp., St. Louis, as combustion engineer and before that spent four years as industrial gas sales engineer with the Lone Star Gas Co., Dallas.

C. L. Brockschmidt

• Changes in the organization and responsibilities of executives of the Central Arizona Light and Power Company, effective March 1, were announced by **Edward H. Coe,** president.

Coe will continue as president but no longer will carry the burdens of general manager. The new appointments:

Louis K. Doutrick appointed vice president and general manager; **A. F. Morairty** appointed vice president with responsibilities of public relations work, postwar planning and industrial development; **George H. Groh** appointed general superintendent and chief engineer in charge of all operations, construction and maintenance, and **Milton G. Sanders** appointed general sales manager.

C. A. Hulse is secretary and treasurer, and **Frank E. Mell** is assistant secretary and treasurer.

• **W. F. Wright**, general manager of Dallas division of distribution and **L. B. Denning, Jr.,** operating manager of the general division of distribution of the Lone Star Gas Co., have announced the following changes affecting personnel in their divisions:

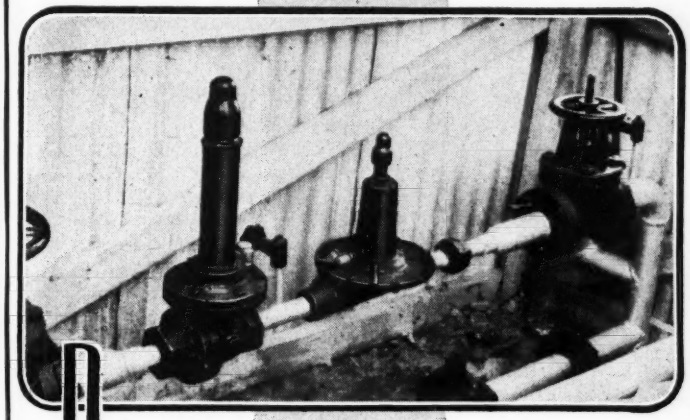
W. F. Pearson has resigned as superintendent of shops and **J. A. Hayes,** plant superintendent for the general division of distribution at Wichita Falls, will succeed him. **Charles L. Rippy,** assistant distribution shop foreman for Dallas division, has been promoted to succeed Hayes.

R. E. Vernon, formerly located at Garland, has been appointed subdistrict manager at Rockwall, succeeding **E. L. Edwards** who has been transferred to Purcell, Okla.

Clarence Baker, formerly subdistrict manager at Glen Rose, has been appointed subdistrict manager at Clifton, succeeding **D. H. Watson,** resigned. **Amos J. Barnes**, formerly located at Cleburne, has been appointed subdistrict manager at Glen Rose.

H. L. St. John, formerly district manager at Temple, has been appointed manager of the Ennis district, succeeding **H. C. Davis,** who has been transferred to Abiline. **George F. Peck, Jr.,** formerly manager of the Terrell district, has been appointed district manager at Temple. **B. B. Stringfellow** has been appointed to succeed Peck as district manager at Terrell.

PRESSURE REDUCTIONS OF FROM 1000 TO 15 LBS. (IN TWO REDUCTIONS)



REYNOLDS GAS REGULATORS

★ For high pressure Gas Control, REYNOLDS builds Regulators capable of reducing pressures as high as 2,000 pounds, but Reynolds Engineers recommend the greater safety of Double reduction installations. In the photograph above, we show an actual field installation. The first Regulator will handle pressures up to 1,000 pounds inlet pressure, reducing same to 100 to 250 pounds outlet pressure. In the second stage the inlet pressure of 100 to 250 pounds is reduced to an outlet pressure of 15 to 40 pounds. Pressure desired, size of pipe connections and other factors govern actual outlet pressures. Let the Reynolds Engineering Department aid in solving your Gas Control Problems.

BRANCH OFFICES

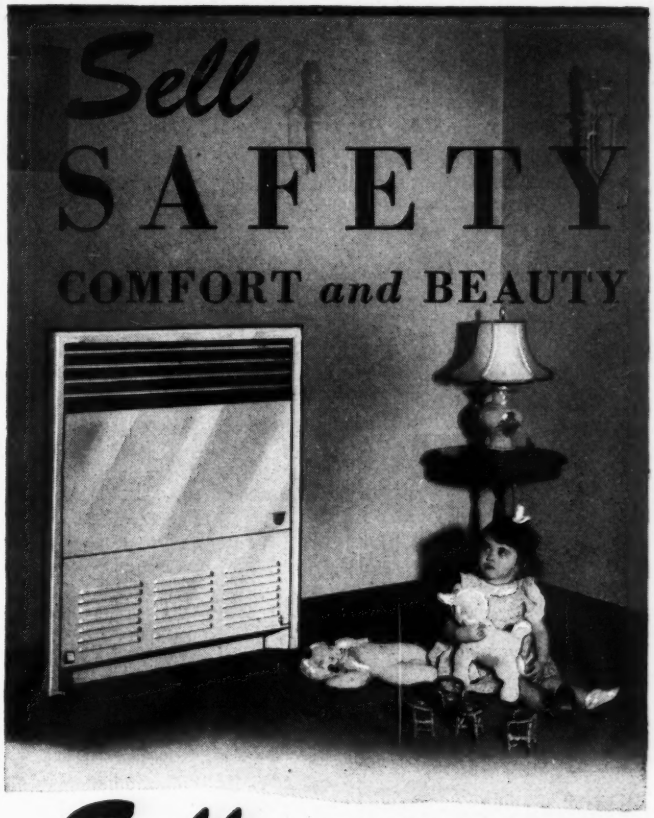
423 Dwight Building, Kansas City, Missouri.
2nd Unit—Santa Fe Bldg., Dallas, Texas.

REPRESENTATIVES

Eastern Appliance Company, Boston, Massachusetts.
Wm. A. Ehlers, No. 268 Park Street, Upper Montclair, N. J.

GAS CONTROL SINCE 1892

REYNOLDS GAS REGULATOR CO.
ANDERSON, INDIANA, U.S.A.

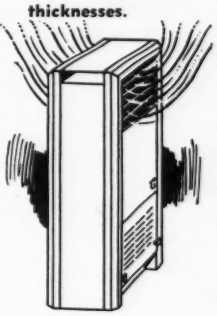


Sell HAMMEL DUAL WALL HEATERS

Sell

THE NEWEST IN GAS-FIRED VENTED HEATERS

In-the-wall installations are available to fit 4-, 8-, or 16-inch wall thicknesses.



Don't overlook the fact that more than half of the American homes have no central heating when you plan your post war sales program.

And, don't overlook the sales possibilities of Hammel Dual Wall Heaters. Installed in the wall between rooms, they give complete heating service. When you sell this vented Hammel heater, you're selling SAFETY—safety for children from open flame and searing heat . . . safety when lighting and extinguishing the heater . . . and safety from fumes.

Learn all the other sales-making advantages of this new dual wall heater; write for information.

Hammel
RADIATOR ENGINEERING CO.
A. S. Martinson & Associates
Successors to Hammel Radiator Corp.
3348 Motor Ave. SINCE 1912 Los Angeles 34

K-CO
BEST IN BRASS
Since 1897
GROUND KEY
Gas, Water & Steam
Valves
TEMPERATURE
and
PRESSURE
Relief Valves
GAS SHUT-OFF
Valves
KITSON COMPANY
A wholly owned subsidiary of
WELSBACH ENGINEERING AND
MANAGEMENT CORPORATION
1500 WALNUT ST., PHILA. 2, PA.
WELSBACH

Often Clean Sand Will Protect Pipe From Corrosive Attack in Active Soils;

IN EXTREME CASES USE ARMORED MONO-CAST PIPE

Ordinarily a bed of clean sand 3 to 6 inches deep on which the pipe is laid and a clean sand covering of equal depth will protect pipe against the corrosive attack of active soils. Some areas, however, such as swamps, muck, brackish or salt marshes and severe alkali soils are so vicious in their corrosive attack that even corrosion-resisting Mono-Cast Centrifugal Pipe should be armored to assure permanence. Armored Mono-Cast Pipe will give lasting service in such severe and corrosive areas where the sand or other treatment may not be effective. Further information gladly supplied on request.

AMERICAN CAST IRON PIPE COMPANY
BIRMINGHAM 2, ALABAMA
Sales Offices in Principal Cities

• **Morris Fisher** and **Dr. Sidney Katz,** have been added to the technical staff of the Institute of Gas Technology, Chicago, it has been announced by **John I. Yellott,** director.

Fisher, a specialist in micromeritics, the science of small particles, has been assigned to work on an improved method of producing carbon black, a paint pigment. He was a chemist for eight years with the U. S. Bureau of Mines at Pittsburgh. He holds BA and MA degrees in science from Carnegie Institute of Technology, Pittsburgh.

Dr. Katz will work in the field of gas chemistry, particularly in the physical chemistry of fundamental gasification reactions. His first assignment is a special project for the National Research council.

Formerly research chemist for Goldsmith Brothers, Chicago, and for the Pfaustiehl Chemical Co., Waukegan, Dr. Katz has served for two years as lecturer in mathematics at Illinois Institute of Technology. He received his Ph. D. at McGill university in Montreal, Canada, after earning his bachelor's and master's degrees at the University of Manitoba. In 1937 he was awarded a traveling fellowship in chemistry by the Royal Society of Canada.

Benjamin Miller has resigned as technical assistant to the director, effective April 30, 1945, to engage in independent consulting practice in New York. He will continue to serve the institute as a consultant.

• **Ralph D. Jennison,** president of the New York State Electric & Gas Corp., New York, announced the following changes in personnel:

William G. Hickling, vice-president in charge of operations, assumed additional duties as general manager; **A. W. Milliken,** vice-president and manager of the company's eastern division, was made superintendent of operations under Hickling, and **J. F. Farley,** general auditor, was made assistant to comptroller **H. C. Fleck.**

• **Matthew Benesh** has been appointed chief research engineer in charge of the research department of the Peoples Gas Light & Coke Co., Chicago. The metallurgical laboratory and the gas research departments of the company have been merged and are now considered the research department.

William H. Wise was appointed manager of the sales engineering section of the domestic sales department. He had formerly been supervising domestic sales engineer of the North Sales Section.

Robert C. Martin was appointed supervising domestic sales manager of North Sales Section.

Fred Hartman, group supervisor of the customer accounting department, was appointed assistant superintendent of the tabulating and key punch groups and the billing section of the customer accounting department.

• **R. M. Conner,** director of the A.G.A. Testing Laboratories has announced the promotion of **Milton Zare** to the newly-established position of supervisor of research. Zare has been employed by the laboratories for nearly nine years, joining the staff as a chemist soon after his graduation from Ohio State University.

• **Allan Johnston,** former industrial salesman of United Gas Pipe Line Co., with headquarters in Shreveport, has been appointed manager of industrial sales for the company, effctiv Jan. 15. He fills the position vacated by the death in Houston last month of **Harry F. Randall.**

Johnston became commercial and industrial salesman for Western Counties Gas Co., Cordell, Okla., in 1927. The succeeding five years were spent in Montana as superintendent of measurement and gas engineer respectively of the Montana Cities Gas Co. at Great Falls, and the Montana Power Co., Butte.

In October, 1932, he was employed by a predecessor company of United Gas Pipe Line Co. as industrial salesman.

• **J. Robert Delaney,** Cincinnati Gas & Electric Co., celebrated his 25th company year in October. All of his service has been in the Gas department, in which his father and two brothers also had served for a total of 62 years.

Since 1926, Delaney has been in the Hotel, Restaurant and Bakery division. A registered professional engineer in Ohio, he holds membership in the International Steward Association and the Society of American Military Engineers.

His father, **J. P. Delaney,** who had a 37 year service record with the company and was superintendent of the Gas department until taking leave in 1929, passed away this spring. **John J. Delaney,** Reliance Regulator Corp., Alhambra, Calif. and **Edward F. Delaney,** brothers, were members of the gas meter department.

• **L. D. Romig** has been elected treasurer of the Southern California Gas Co., Los Angeles, according to an announcement by **F. S. Wade,** president. Romig has been with the company since 1922 and formerly held the position of assistant comptroller. He succeeds **G. A. Detrick** who retired because of ill health. Romig will also serve as manager of the tax department.

E. E. Ellis has been named supervising engineer of Southern California Gas with jurisdiction over the civil and design engineering departments reporting to Manager of Engineering Services **B. M. Laulhere,** according to an announcement by **H. L. Masser,** executive vice president.

J. T. Cortelyou has been named building maintenance engineer under **W. R. Shettel,** construction engineer.

Albert W. Turner will head up safety and industrial accident duties under Secretary **R. R. Blackburn,** while **S. W. Binckley,** assistant secretary, will have charge of other duties previously handled by Ellis.

Hamilton H. Knott has been named acting advertising manager succeeding **Daniel L. Scott** who retired Feb. 1. Scott took the position of acting advertising manager upon the departure of **J. S .Spaulding** for military service in the army air forces. Knott formerly was Scott's assistant.

In his 32 years with Southern California Gas, Scott has held several executive positions, including manager of public relations, personnel and advertising. He had also supervised company publications and was editor of the magazine "Gas News."

• **W. M. Henderson,** superintendent of distribution, Southern California Gas Co., Los Angeles, will take on certain new duties of postwar planning March 1, according to **Elting Henderson,** manager of distribution.

Effective the same date, **H. M. Dwight** will be transferred to Flower Street headquarters to the newly created position of supervising engineer of distribution in the central division. Dwight was formerly division superintendent of the Kern division and will be succeeded there by **James Millen,** now division engineer at Visalia. **R. D. Pruitt** will move up from his present position as engineering assistant to division engineer.

• **E. G. Lawson,** chairman of the board of directors of the Coast Counties Gas and Electric Co., has announced the following changes made at the Board's meeting, Feb. 5:

A. E. Strong and **Charles Grunsky** of Santa Cruz, and **Lt. Col. A. R. Bailey** of San Francisco (now serving in France) were elected directors to succeed **J. H. MacGaregill, J. L. Hanna** and **B. W. Letcher,** resigned:

R. N. Dreiman of San Francisco was elected a vice-president, in addition to his posts as comptroller and a director:

J. K. Horton of San Francisco was elected secretary and assistant treasurer, succeeding **B. W. Letcher,** resigned:

H. D. Armstrong of San Francisco was elected treasurer, succeeding **H. C. Judd,** resigned:

And **John E. Wolfe** of San Francisco was elected assistant secretary.

• **William A. Kneeland,** treasurer of the Hartford Gas Co., Hartford, has retired after 44 years of service with the company. Kneeland joined the company in 1901 as a bookkeeper and was appointed assistant treasurer in 1912. In 1935 he was promoted to treasurer, as well as assistant secretary. He served in these capacities until his retirement.

• **Harry Batchelder** has been made assistant utilization manager of the central division of the Puget Sound Power & Light Co., Seattle. He came to Puget Power in 1920 as an operator with the subsidiary company, Washington Coast. In 1923 he went into sales work in Wenatchee and was transferred to Seattle in 1927, at which time he was made supervisor of sales. He later became industrial service director in the general utilization office, which position he held until his present promotion.

• **Earl Smith** has been elected president of the Atlantic Citv Gas Co., succeeding **Robert W. Wiederwax** who died Dec. 6. Smith was formerly affiliated with the C. H. Geist Co., Lansing. In 1920 he was transferred to the Atlantic City Gas Co. as superintendent of manufacture. When Public Service Corp. of New Jersey acquired control of the company, Smith continued as superintendent. In Dec., 1941 he was promoted to general superintendent, which position he held at the time of his election as president.

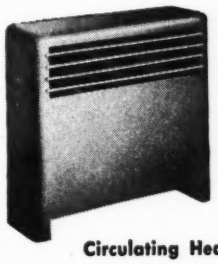
Manufacturers

• **Theodore Thiele** has been named chief engineer of the Domestic Manufacturing Co., Los Angeles, Calif. As a part of his work he will act as consultant to water heater manufacturers on postwar production problems.

Theodore Thiele

For a number of years he was employed by the A. O. Smith Corp. as chief test and development engineer of the Home Appliance Division, and was instrumental in development of that company's water heater line. Thiele's engineering background dates back to European university degrees in physics and electrical engineering. In Switzerland he carried on extensive developments in electrical and physical problems in connection with gases and gas turbines.

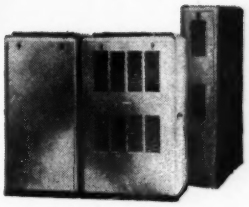
• **Murray S. Hitchcock,** sales engineer, American Meter Co. in the Birmingham area, has been transferred to that company's Philadelphia branch, which is under the managership of **William G. Hamilton, Jr.**



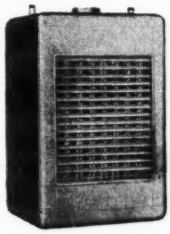
Circulating Heaters

UTILITY
Appliance Corp.

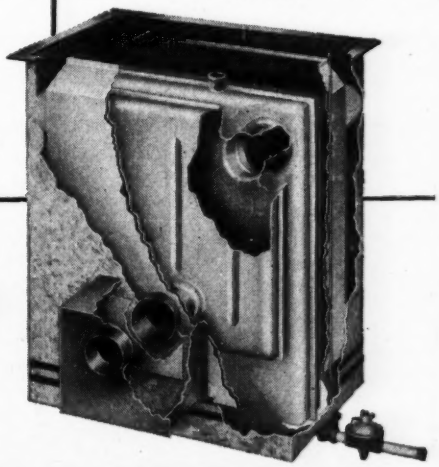
When war regulations are lifted to permit manufacture again, Utility will be ready with a complete line of gas-fired Floor Furnaces, Unit Heaters, Circulating Heaters and Forced Air Furnaces, Illustrated literature on these outstanding appliances will be sent on request.



Forced Air Furnaces



Unit Heaters



UTILITY
Appliance Corp.

UTILITY

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• **Oscar R. Olsen,** president of the Pennsylvania Industrial Engineers, which specializes in gas burning equipment and all types of metallurgical furnaces, has announced that **Carroll B. Mershon** has been appointed assistant to the president of the company, effective, Feb. 15, 1945. The offices of the company are in the Fulton Building, Pittsburgh. Penn.

• The Foxboro Co., Foxboro, Mass., announces the addition of **Frank Renner** to the staff of sales engineers covering the Southern California territory. His headquarters are at Foxboro's office in Los Angeles, 2307 East 8th St., (21).

Robert Beers has joined the Foxboro Co. staff of sales engineers attached to the New York office and has already taken up his duties in the New York-New Jersey territory. Foxboro's New York office is at 420 Lexington Ave., (17).

• **Alfred G. Blake,** on leave of absence from the sales staff of the Rudd Manufacturing Co., Pittsburgh, to the War Manpower Commission, has been promoted to director of field operations for the training within industry division of WMC. He was formerly T.W.I. director of management contacts.

• Election of **C. V. McConnell** and **A. B. Ritzenthaler** to fill newly-created posts as vice presidents and the promotion of **Keith B. Miller** to sales manager, has been announced by **Paul R. Tappan,** president of the Tappan Stove Co., Mansfield, Ohio.

K. B. Miller

McConnell, who has served as sales manager since 1928, will be in charge of merchandising and sales promotion, while Ritzenthaler, former eastern district manager, with headquarters in New York City, and more recently war products manager, will have supervision over Tappan salesmen.

• **Roy W. Tarleton,** Mayor City of Compton, Calif., and for 14 years general manager of the Southern Heater Co., Compton, in February accepted a position as general manager of the Hot Stream Heater Co. plant in Dallas. During his career on the Pacific coast, he was active in general industry affairs, serving at one time as chairman of the water heater division, manufacturers' section. Pacific Coast Gas Association.

• **Col. R. W. McClenahan,** former manager of American Meter Co.'s Philadelphia manufacturing and sales division, has returned to this country on leave after two years and eight months of continuous foreign service.

He was awarded the Legion of Merit while serving as Intelligence Officer attached to the Ninth Air Force in the middle east, and more recently King George of England conferred upon him the Order of the British Empire for distinguished service in cementing relations between the Allied Nations.

• **George H. Christen,** Pacific coast manager for the Crosby Steam Gage & Valve Co., Inc., Los Angeles, announces the appointment of **Harvey Menard** as sales and service engineer, operating on the entire Pacific coast.

• General Controls Co., Glendale, Calif. announces the appointment of **Joseph W. Wilson** as manager of the Glendale branch office. After graduating from Holland's Domestic Heating Engineering and Combustion Engineering School, he served as heating engineer for the Holland Furnace Co. for 15 years and as manager of several Holland branches.

• **Carl Schroeder** has joined the air conditioning division of Servel, Inc., Evansville, Ind. He was previously associated with the research division of Servel's engineering department.

• **Walter F. Myers** has been appointed to the staff of the Washington office of the Cooper-Bessemer Corp. it is announced by **Stanley E. Johnson,** general sales manager. He will assist **Charles G. Cooper,** director of the Washington office, in the handling and supervision of government contracts and sales and service in the Southern Atlantic States.

• **George Fay** has resigned as treasurer of the Hydril Corp., Los Angeles, to become comptroller of the Rheem Manufacturing Co.

SEMET-SOLVAY
ENGINEERING CORPORATION

Blue Gas Plants
Water Gas Machines
Washer Coolers
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The Mettler "FAN-AIR" Gas Burner

IS A MECH'L DRAFT AUTOMATIC gas burning SYSTEM embodying electric and throttling control with "TRANSAXIL" FLAME GUARD PILOT all properly combined for safe, efficient combustion. It's the "post war" burner. Available now and prompt shipment of all sizes.

IDEAL FOR SCOTCH MARINE BOILERS

Mettler Entrained Combustion Gas Burners

FOR ALL Purposes Kinds of gas Pressures

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JANUARY 2nd, 1923
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LEE B. METTLER CO.

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Obituaries

• **Ray G. Logue,** 62, vice president and general manager of the Ward Heater Co., Los Angeles, passed away Feb. 22 of a heart attack. Logue has been identified with the Pacific Coast gas industry for more than 30 years, starting his career with the Seattle Lighting Co. In 1917 he came to Los Angeles as president of Beacon Lighting Co. He joined Ward in 1927.

R. G. Logue

He was a leading member of the Association of Gas Appliance and Equipment Manufacturers, serving in 1940 as convention chairman for that association's annual meeting in Los Angeles. A member of the Pacific Coast Gas Association for 21 years, he served as general chairman of the manufacturers' section for two years, 1938-39. Prior to that he had served as vice-chairman and as chairman of the section's heating division. He was a member of the Southern Gas Association and of the Gild of Ancient Supplers of Gas Appliances, Skills, Gins, Accessories and Substances.

• **Lester Bryson Wiegers,** vice president, secretary-treasurer and member of the board of directors of Electric Bond and Share Co., New York, died Jan. 8 of a heart attack, at age 42.

Wiegers joined the company as a member of the accounting department in 1925. Prior to that, he was with Marwick, Mitchell & Co., certified public accountants. In 1935 he was appointed assistant secretary and assistant treasurer of Bond and Share and five years later became secretary-treasurer and a director. On Nov. 6, 1944, Wiegers was appointed vice president.

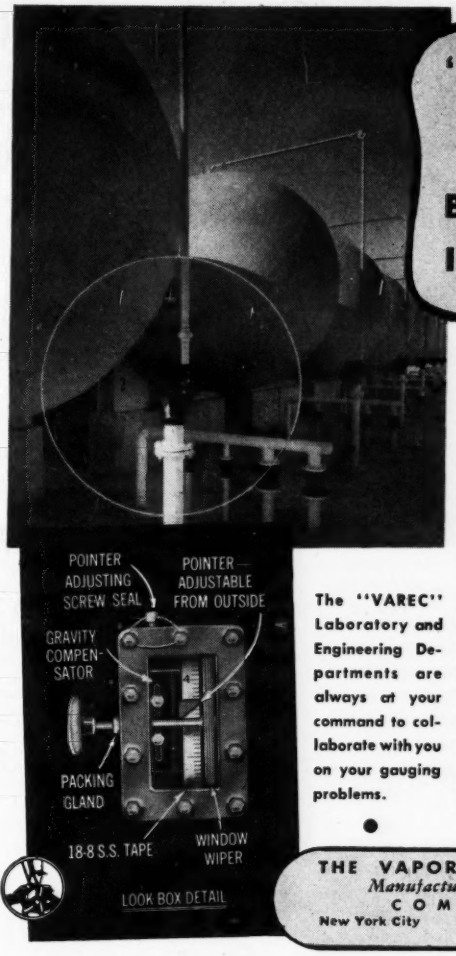
• **Robert S. McCarty,** advertising manager of the Philadelphia Co. and subsidiary companies of the Duquesne Light Co., and for the Trustees, Pittsburgh Railways system, died Dec. 31.

McCarty entered the employ of the Philadelphia Co. in 1921, in the engineering department. In 1924 he was transferred to the vice president's office as special representative in public relations work. In 1925, he was appointed advertising manager.

• **Ralph L. Bailey,** Pacific coast manager of the Whitehead Metal Co., New York, manufacturers of gas-fired water heaters, died Feb. 16 at the age of 42.

Bailey had been with the company since 1936 and had been Pacific coast manager since 1939. Prior to his becoming associated with the Whitehead Co., he was affiliated with the Pacific Gas & Electric Co., San Francisco.

• **Harry E. Randall,** manager of United Gas Pipe Line Co.'s Industrial Sales Department and a vice president of Compania Mexicana de Gas, S. A., died of a heart attack Dec. 28, in Houston. He had been with the company for almost 20 years.



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ACCURACY and DEPENDABILITY characterize the extensive line of "VAREC" Gastight Automatic Tank Gauges designed to fit any shape of tank and for operating pressures from 0 to 300 pounds per square inch. Outstanding basic features are the look-box which may be read from near ground level or from top of the tank, aluminum tape sheaves mounted on stainless steel ball bearings, floats made in several designs and of a large number of different materials, and simplicity of installation and operation. Tape, guide wires, and counterweight cable are made of 18-8 stainless steel as standard. "VAREC" Look-boxes are equipped with adjustable Indicator, Gravity Compensator, and Window Wiper. The latter feature assures easy reading of the tape without having to open the gauging system to atmospheric pressure. An exclusive feature is the Gravity Compensator which is furnished with the Look-box and on the Float in most of the Gauges. The Gravity Compensator, a patented "VAREC" feature, enables the gauge user to read direct on the tape for any gravity of liquid without having to resort to gravity conversions. The standard Float is heavy aluminum plate, two halves gas-welded together, and tested for pressures up to 3 ounces per square inch. The self-bailing float is standard for operating pressures over 3 ounces and up to 20 pounds. The reinforced float is recommended for pressures over 20 pounds per square inch.

The "VAREC" Laboratory and Engineering Departments are always at your command to collaborate with you on your gauging problems.

The Pace Setter Since 1928

THE VAPOR RECOVERY SYSTEMS COMPANY
Manufacturers of Gas Control and Tank Equipment
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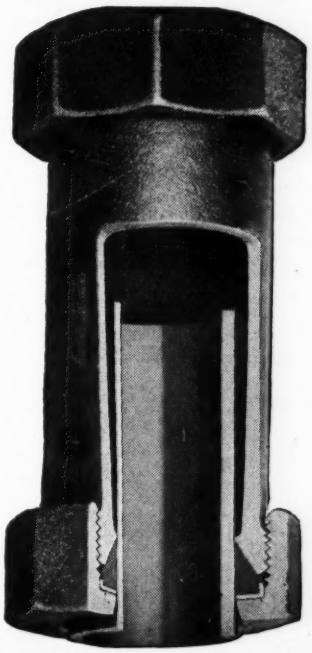
Agencies Everywhere

NORMAC COUPLINGS, SLEEVES AND FITTINGS



for maximum deflection, ease of "stabbing," complete confinement of the rubber!

So close are "Normac" rubbers confined at the gasket tip that possibility of flow is reduced almost to "nil." These couplings, sleeves and fittings . . . approved by gas utility men across the country for their time-saving features, ease of handling and dependable service . . . are available in a complete range of sizes. Made from air furnace malleable iron they provide greater wall thickness than pipe on which used.

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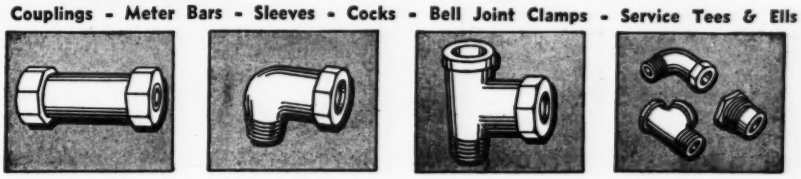
Couplings - Meter Bars - Sleeves - Cocks - Bell Joint Clamps - Service Tees & Ells



CURRENT READING

Bottom-Hole Pressure Data in Conservation and Proration Work. "Oil and Gas Journal," Jan. 6, 1945, pp. 69, 73, 75. Information concerning reservoir pressure is essential to efficient operation of an oil field. Bottom-hole pressures, therefore, are of primary importance to conservation authorities in fixing production rates and in formulating operating rules. This report gives the views of the Research and Coordinating Committee of the Interstate Oil Compact Commission regarding the measurement of bottom-hole pressures and the application of the data to conservation and proration problems. The report has been prepared for the purpose of furthering the standardization of routine engineering work in the various states.

New Trends in Utilizing Petroleum Resources—G. Triplett. "Oil Weekly," Jan. 15, 1945, pp. 21, etc. Chemical engineers are learning much about processing not only oil, but natural gas as well, and promise is that mankind will enjoy many materials not heretofore had because, as a raw material, petroleum holds greater promise than coal tar which is basis for at least a half million derivatives. Caution is sounded about the influence of politics.

Reconditioning Pipe Lines Under Pressure—T. L. Turner. "Oil Weekly," Dec. 4, 1944, pp. 40, 41. Pipe line reconditioning has reached a new perfection in which the movement of oil is not interrupted while the line is removed from the ditch, then cleaned spot welded, patched, rewrapped, repainted and put back in the ditch. The procedure is described.

Choice of Route Important to Pipe Line Construction—F. H. Love. "Petroleum Engineer," Dec., 1944, pp. 103, 104, 106. Stanolind's line from Elk Basin field to Casper, Wyo., is laid through rough country and at high altitudes.

Solving Problems of Gas Line Design by Use of Significant Factors—C. L. Brockschmidt and M. K. Hager. "Petroleum Engineer," Dec., 1944, pp. 142, etc. A mathematical treatment of the problem.

Pressure-Volume-Temperature and Solubility Relations for Natural Gas-Water Mixtures—C. R. Dodson and M. B. Standing. "Calif. Oil World," 1st Dec. issue, 1944, pp. 21, etc. Pressure-volume-temperature and solubility data are presented for mixtures of natural gas and water and for mixtures of natural gas and two typical oil field brines. The data permit estimations of the solubility of gas in reservoir interstitial waters and of the amount of water vapor present in the free gas phase of the reservoir. The compressibility and formation volume of the gas-saturated interstitial water are given as functions of the gas solubility. The investigations covered pressures from 500 to 5000 PSIA; temperatures from 100° F. to 250° F.; and water or brines having up to 35,000 parts per million total solids.

Fusion Welding Cast Iron—(12 pages—Form 5232)—A series of practical exercises explaining in detail the technique of welding cast iron with cast iron rod is given. Classification of types of cast irons, welding characteristics, heat treatment, inspection of welds and instructions on building and the use of a preheating furnace are also included. Copies of the booklets described above can be obtained without cost from the nearest office of The Linde Air Products Co. When requesting this literature please ask for them by the form number.

How to Weld Pipe—(24 pages—Form 5377)—Comprehensive instructions that will enable the beginner to master the more commonly met problems of pipe welding are featured in this booklet. It describes methods of joint preparation; the making of horizontal welds in various diameter pipe; the laying out of templets for accurate fabrication of pipe; and ways of testing welds. Copies of the booklets described above can be obtained without cost from the nearest office of The Linde Air Products Co. When requesting this literature please ask for them by form number.

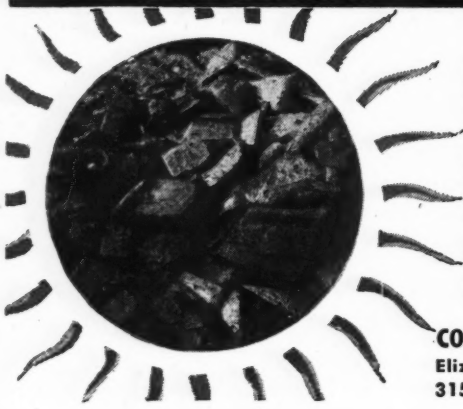
Mechanics of Producing Oil, Condensate, and Natural Gas—P. J. Jones. "Oil and Gas Journal", Dec. 2, 1944, pp 73, etc., Part 5. Dec. 9, 1944, pp. 89, etc. Part 6. Dec. 16, 1944, p. 88, etc., Part 7. 30, 1944, pp. 270, etc., Part 9. Jan. 6, 1945, pp. 49, etc., Part 10. Jan. 13, 1945, pp. 64, etc., Part 11. Jan. 20, 1945, pp. 64, etc., Part 12. Jan. 27, 1945, pp. 263, etc., Part 13.

Fischer-Tropsch Commercial Process Announced by Kellogg—A. L. Foster. "Oil and Gas Journal", Jan. 13, 1945, pp. 48, 49. A new commercial process whereby motor fuels and other hydrocarbon products are synthesized by the Fischer-Tropsch synthesis has been announced by M. W. Kellogg Co., engineers and builders of refinery installations. According to statements made this process enables the refiner to produce motor fuel from natural gas of 75 A.S.T.M. octane number, clear—that is, without addition of ethyl fluid—or research octane number of 83. This product may be made at a price of 5¢ per gal., based on 5¢ per Mcf of gas, and a plant depreciation rate of 10% per annum.

R. I. 3772, Bureau of Mines Thermal Expansion of Pressure Samples of Hydrocarbon Liquids from Gas-Condensate Wells—R. V. Smith, M. A. Schellhardt and E. J. Dewees.

Oil Recovery by Air and Gas Pressure. "World Petroleum," Dec., 1944, pp. 42-45. Application of air and gas pressure to secondary-recovery operations in the Appalachian region is discussed.

CONNELLY IRON SPONGE



High in efficiency . . . low in cost. In hundreds of plants throughout the country, Connelly Iron Sponge has proven itself . . . the finest purification material on the market. Not only does it lower your purifying cost but its high activity and capacity tends to reduce distribution and service complaints because of the cleaner gas which ultimately lowers operating and maintenance costs.

If you have a problem in gas purification, Connelly's 68 years of experience is at your service. Our engineers can help you . . . there is no obligation on your part.

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CLAMPS AND SADDLES FOR CAST IRON AND STEEL PIPE. STANDARD OF THE WORLD FOR NEARLY HALF A CENTURY

The Regulation and Blending of Natural Gas—H. A. Brown. "Oil Weekly," Jan. 15, 1945, pp. 32-34, 36. Utmost care required for selection of proper regulator which plays most important role in distributing systems. Capacity chart used to determine valve size. Equal pressure percentage blending unit principle explained.

Helium Production Is Centered in United States—M. W. Baden. "Oil Weekly," Jan. 8, 1945, pp. 34, etc. Discussion of discovery, production and uses of helium gives particular emphasis to areas in Kansas where gas wells in large anticilinal fold passing through two fields, Dexter and Otto, produce at shallow depth. Foreign production is slight.

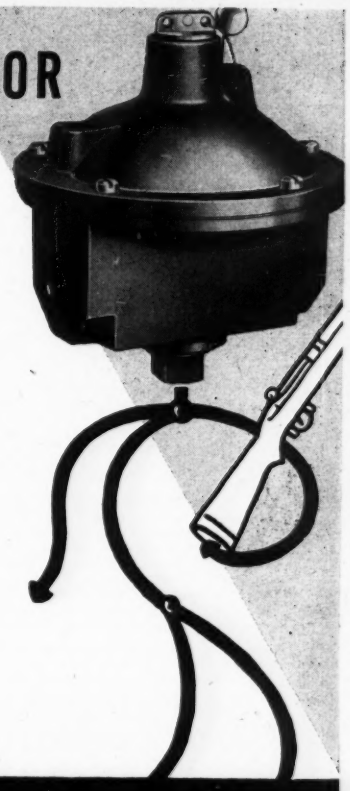
Gas Drive Mechanism in Secondary Recovery—R. J. Day and S. T. Yuster. "Oil Weekly," Jan. 1, 1945, pp. 24, etc. Information heretofore lacking on some phases of the use of gas to impart energy into a depleted formation are given. Other experiments are under way.

Proposed Simplified Method for Hydrocarbon Phase Equilibrium Calculations—C. G. Kirkbride. "Petroleum Refiner," Jan., 1945, pp. 99-109. A new method has been developed and is proposed for phase equilibrium calculations on hydrocarbon systems. The method is based on the use of relative volatilities of the hydrocarbons with reference to ethane. The proposed method is somewhat simpler to apply than the use of equilibrium constants, particularly for the inexperienced individual. The variation in relative volatilities with temperature for all but two of the 19 components is between about 1.2% and 5% of the corresponding variation in equilibrium constants. This results in a large reduction in the laborious calculations compared with the use of equilibrium constants. Relative volatility charts have been prepared for hydrogen, methane, ethylene, propylene, propane, isobutylene, butene-2, butene-1, isobutane, n-butane, isopentane, n-pentane, n-hexane, benzene, n-heptane, toluene, methylcyclohexane and n-octane.

Control of Industrial Atmospheres: Dusts, Fumes, Mists, Vapors and Gases—W. N. Witheridge, "Heating, Piping and Air Conditioning," Dec., 1944, pp. 712-717. A presentation of the problems encountered by the heating and ventilating engineer in the control of industrial atmospheres is given. Common causes of failure in industrial ventilation systems are presented in the light of the author's experience. He emphasizes that the basis of ventilation standards and the methods to be used in determining whether an installation complies with given requirements should be fully investigated before guarantees of performance are given.

Vibration in Compressor Plant Piping—M. L. Arnold, "Calif. Oil World," 1st Dec. issue, 1944, pp. 4, etc. This paper briefly describes the mechanical effect of vibration on piping, the mechanics of vibration, and the origin of the forces causing vibration in compressor plant piping. It also points out the avenues of approach to the design of a vibration-free plant.

STANDING GUARD FOR
LONG LIFE



H-M LOW PRESSURE REGULATORS give dependable, long-life service, economically and with a minimum of attention. Precision engineered, these regulators control the gas flow.

Send for complete details regarding available sizes and specifications.

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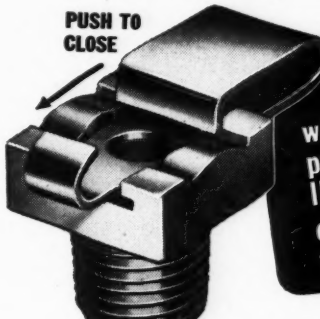
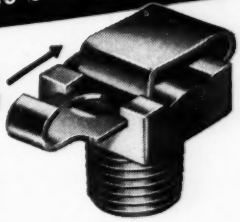


Can you use a new drain cock that—will operate under pressures up to 200 lbs. per sq. inch? can be used with all types of liquids?

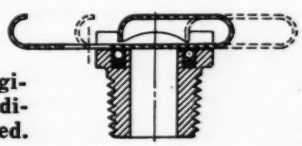
VALVE OPEN

TO OPEN



VALVE CLOSED

The construction of this new drain cock is so simple that the possibility of functional failure is reduced to a minimum. It has but four working parts and is sealed with a standard "O" type ring that can be easily replaced. Its sturdy and rugged construction, lightweight, positive seal and minimum of working parts make this drain cock a possible must in all postwar water, fuel and hydraulic systems. For full information write the engineering department and indicate use or application desired.



Whittaker

WM. R. WHITTAKER CO., LTD., 935 NO. CITRUS AVE.
LOS ANGELES 38, CALIFORNIA

Small Return Shown on Canadian Gas Field

About $4,500,000 has been spent on development of gas and oil fields in the Canadian province of New Brunswick in the past 40 years and slightly more than that amount has been realized, according to H. W. Hole, general manager of the New Brunswick Gas and Oil Fields, Ltd., Moncton, New Brunswick.

Drilling operations extend back to 1859 when work was carried out by a Pittsburgh firm. In 1876-79 three holes were drilled with oil being obtained from two. Little work was done then until 1899 when the New Brunswick Petroleum Co. was formed, and 78 holes were drilled up to 1906 with 35 producing small amounts of oil.

In 1908 the Maritime Oilfields Co. was formed and in 1909 boring in the Stoney Creek district, now the producing section of the province, was carried out. In 1912 piping was completed to the city of Moncton and since that time the field has produced 20 b. c. f. of gas and 350,000 barrels of oil.

POSITION WANTED

Young Manager, with Natural Gas Distribution Company for past ten years, wishes to change to new situation in same field. Sound background of achievement in operations and economics of business development. Would prefer responsibility of reasonably small property needing improvement. Box 550, GAS Magazine, 1709 W. 8th St., Los Angeles 14, California.

ASSISTANT SALES MANAGER WANTED

Manufacturer of Gas, Electric and Oil Burning Water Heaters, Domestic Heating Equipment, Tanks, etc., selling to jobbing accounts, desires Assistant Sales Manager, minimum five years experience Home Appliance Field. Write complete personal data and experience. Box 500, GAS Magazine, 1709 W. 8th St., Los Angeles 14, California.

Brooklyn Union Bonds Buy 39 Ambulances and Plane

Employees of Brooklyn Union Gas Co., early in January, learned that their Sixth War Loan purchases totalled—not $125,000—but $203,150, or 1.6 times their original goal. This figure includes purchases of $77,800 included under the regular payroll deduction plan for November and December.

The Brooklyn Union total will permit the purchase of 39 field ambulances in addition to the C-47 hospital ambulance plane, which employees set as their goal.

Southern California Gas Co. Builds New Holder

Southern California Gas Co. has completed a new high pressure spherical gas holder at Visalia, Calif., according to Elting Henderson, manager of Distribution, Compression and Storage.

It was built to augment the gas supply in the Visalia area in the San Joaquin Valley. The 65-ft. in diameter holder required 300 tons of 1-in. steel. Gas will be stored at 55 lb.

Winners in P.G. and E. Employee Contest Named

Pacific Gas and Electric Co., San Francisco, Calif., has announced the winners of its 1944 Employee Suggestion Contest—a contest which this year broke all records for the number of suggestions submitted and accepted as meritorious.

Lawton C. Hughes, general office, won first prize of $200 for his method of mechanical computation and printing of gas and electric rate charts. Second prize of $150 went jointly to W. A. Cohick, east bay division, and J. E. Aymar (deceased), central supply department, for their pilot blast pump, 300 of which are now in successful operation throughout the company's system. The $125 third prize was given to Harry V. Lalor, general office, for his improved method of revising stockholders mailing lists. A fourth prize of $50 went to Fred Frey, north bay division, for a gas regulator.

All acceptable ideas now receive $5 and are eligible for entry in the annual contest. Interest in this program has increased exceedingly with 310 suggestions having been received from January to July 1943, and 468 for the same period in 1944.

Scharer to Head Export Division for Servel

Servel Inc. announces the reorganization of its export activities by the formulation of the International Division, according to Geo. S. Jones, Jr., vice president in charge of sales.

A. F. Scharer

The new division, under the direction of A. F. Scharer who has been in charge of Servel's export business since 1929, will have headquarters at 51 East 42nd St., New York 17.

In addition to its own products, the International Division of Servel Inc., will promote the distribution of a complete line of refrigeration fixtures of allied manufacturers for sale through its world-wide distributing organization.

Additions to Gas Valve Standards Distributed

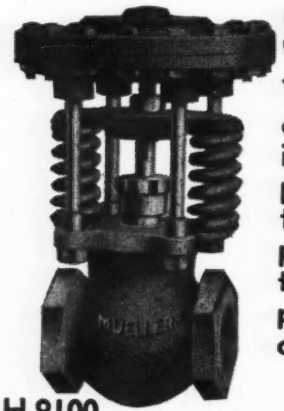
New provisions for inclusion in American Standard Listing Requirements for gas valves have been printed and distributed to the industry for criticism. They consist mainly of additional dimensional and constructional features which apply to gas range valves. Generally accepted as representing best current practices, they have accordingly been designated as "standard" features and included in present listing requirements. While not mandatory, they are nevertheless highly recommended.

Originally proposed by manufacturers of gas valves in the interest of standardization, suggested additions were reviewed by the subcommittee on Listing Requirements for Gas Valves at its recent meeting. With minor changes the provisions were adopted for review and criticism.

IT'S LIKE *writing* A LETTER HOME

These ads month after month . . . telling you that all of our production is going to war . . . are simply to remind you that the name to remember when you want real snap-acting gas controls after the war is

SPENCER THERMOSTAT CO. KLIXON ATTLEBORO, MASS.



SENSITIVE BURNER CONTROL

This MUELLER Regulating Valve is ideal for control of boiler pressures where gas or oil is used for fuel. The phosphor bronze diaphragm has a large area, and is sensitive to the slightest changes in boiler pressures. The power created by this large diaphragm area, together with the full seat opening assures positive operation and fully controlled flow of fuel to the boiler.

H-9100

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